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by

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PRÆLIMINARY.

During the year April 1896 to April 1897, I had the privilege of acting as house-surgeon to Professor Annandale at the Royal Infirmary Edinburgh. Shortly after I commenced my duties, two or three cases of delirium occurred among the patients; as I had previously acted for some time as assistant medical officer to the Yorkshire East Riding Lunatic Asylum, I was induced to take a special interest in these cases and to observe the mental symptoms more closely than is perhaps usually done in a surgical ward. From time to time during the year similar cases occurred and of all I kept detailed records; when enquiring into the exact cause of delirium in each case, I found that the literature likely to throw light on the matter was comparatively meagre, indeed I have only found one complete treatise on the subject in the English language, and that was published in Ashurst's Encyclopaedia of Surgery more than seventeen years ago, at a time when septic processes were not yet thoroughly understood, and when, in consequence, it was difficult, if not impossible, to exclude some form of septic fever as an exciting cause of delirium occurring in a case under surgical treatment, while the comparative frequency of delirium

due to this cause led to other causes being sometimes overlooked; at that time too, little or no attention had been directed to certain cases of delirium, such as Iodoform poisoning, which are now universally recognised. It occurred to me therefore that, if while describing some of the cases I had myself observed, and referring to others which have been recorded, I should aim at giving an exposition of the etiology, diagnosis, course, treatment and prognosis of all the forms of delirium liable to occur in cases under surgical treatment, I had an interesting and not altogether uninstructive subject for a thesis.

I have chosen as the title for this thesis the term, Traumatic Delirium; I may now say that I use the word Traumatic in its broadest sense; by trauma I understand not merely an accident, but also any lesion, however originating, which renders surgical treatment desirable; what may be understood by the term delirium I shall indicate in the Introduction in which I shall discuss the subject in a general way; whilst doing so I shall give a list of what I consider to be the possible causes of traumatic delirium; I shall then consider each variety separately, illustrating my remarks when possible by reporting such cases, either observed by myself or described by others, as come under that category. In the case of some of the less common

surgical diseases I have thought it advisable to very briefly recapitulate the symptoms of the disease, but I wish it to be understood that with the exception of the section on Iodoform poisoning, no part of this thesis is intended to be a treatise on anything but the mental condition. With regard to Iodoform poisoning it appeared to me that a full account of the condition would not be inappropriate as it is a subject of great importance and has only been described, as far as I am aware, either briefly or merely with reference to special cases; in discussing it, I have of course given prominence to the consideration of the mental disturbance that may arise.

Some years ago an interesting paper, entitled "The Mind as a Diagnostic Surface" was published by Richardson in the Asclepiad, in which he suggests that "each serious distinctive desease has its own distinctive mental state or delirium, and that if each delirium were carefully observed and written down for reference, there would be gathered together a series of phenomena as specially diagnostic in their way as any of the more commonly recognised physical indications"; that this proposition holds good in certain cases I do not think there is any reasonable doubt, but whether it will ever have the universal application Richardson seemed to hope that it might is still problematical; it is a suggestion,

however, that any one in discussing the question of delirium would do well to at least bear in mind; as I shall point out in due time I think I have detected a special type of mental disturbance in some of the varieties of traumatic delirium.

At the end will be found a complete list of the authorities whose writings I have consulted.

I should like to take this opportunity of expressing my deep gratitude to Professor Annandale for his kindness in allowing me to report in this thesis several cases which occurred in his Wards at the Royal Infirmary and for allowing me to utilise his case books in preparing certain statistics; I am also very grateful to Dr. Clouston for kindly allowing me to quote from the case books at the Morningside Asylum such notes as I wished of the further progress of patients who had to be removed from the Infirmary to the Asylum.

INTRODUCTION.

Delirium is a condition in which there is temporary perversion of the mental ~~powers~~ processes due to some ascertainable cause; it is distinguished from insanity by its temporary nature and by the fact that once the cause is removed , the normal workings of the mind are quickly re-established.

There are three well-known phenomena of delirium; false ideas or delusions; false perceptions of sensory impressions, or illusions; and fictitious perceptions without the presence of any sensory impressions, or hallucinations. It is not essential however, that any of these phenomena should be present, for we are entitled to assume with Richardson that delirium includes perturbation, depression, or any other special variation or deflection of mind in a patient who under ordinary circumstances does not exhibit such abnormality.

There is great variety in the expression of delirium; sometimes it shews itself as a mere passing fancy, and is difficult to detect; at other times the condition is obvious. It has been usual to describe it as'quiet'or 'active' .

The subject of 'quiet delirium' often talks continuously, but in a low monotonous voice, and it may be difficult to make out what is said; in 'active delirium' there is more energy in the manifestation of the mental processes and the patient often tries to

act in accordance with his erroneous ideas; the actions range from trivial deviations from the normal standard to the most violent efforts threatening injury to the patient himself or his attendants. Delirium may also conveniently be classified as maniacal or melancholic; it is interesting, however, to note that "some things common in insanity seldom occur in delirium, e.g., the extreme and persistent emotional depression of melancholia, the exaggeration of ideas seen in general paralysis of the insane , the outrageous delusions of personal identity met with in some cases of chronic insanity and the rhetorical loquacity of acute mania" (Gowers)

: The causes of traumatic delirium are very numerous; they may be divided into predisposing and exciting, and it is often convenient to refer them to one of these groups, but no absolute distinction is possible, many causes being at one time predisposing, at another exciting. It is seldom possible to assign a case of delirium to any one cause; there is generally a predisposing cause and an exciting cause and not infrequently the number of either or both is increased . Some of the cases I am going to describe should therefore be included in more than one group; this, however, would be inconvenient and therefore after apportinning each case to that cause which was in my opinion the determining cause of the delirium, and without the

existence of which delirium might possibly not have occurred, I shall not do more than mention it in the other groups to which it might have been assigned. The complete list of causes I shall give of delirium will perhaps appear rather long; it might have been curtailed; indeed many of the cases I shall describe, being cases occurring after operation, could be ascribed to the one cause of "Shock". I think, however, it will become clear that considerable subdivision is not only interesting, but also important both for prognosis and treatment.

Delirium then may be chiefly due to a particular diathesis; of such diatheses we have the Senile, the Nervous, the Alcoholic, the Malignant, the Tubercular and the Syphilitic, whereby the Syphilitic diathesis we mean either the congenital diathesis of Inherited Syphilis, or the acquired diathesis of ~~tertia~~ Tertiary Syphilis. Again delirium may be chiefly due to a poison introduced from without, and first we have the organismal poisons, namely, Septic Infection, Erysipelas, Anthrax, Glanders, Hydrophobia, Tetanus, and Tubercle; next we have the non-organismal poisons, such as Iodoform, Alcohol, and Chloroform. Delirium may also be due to poisons produced within the body as in Uraemia, and Intestinal Toxaemia; it may also arise in the course of two surgical diseases not yet proved to be of an organismal nature, namely, Malignant disease and Syphilis. Further there are certain more or less unclassified condi-

tions which may cause it, namely Shock, Haemorrhage, and Pain. We may sometimes say that Delirium is due to injury or disease of certain definite regions; hence we have the following causes of delirium: - Head Injury, Diseases of the Brain and Membranes, Affections of the Abdominal Organs, and Lesions of the Reproductive Organs. Last of all we have as a special type of delirium, the Delirium preceding Death,. All these forms of delirium will be fully discussed in the various sections; for the sake of simplicity however, some that have been here mentioned separately will be grouped together, all varities of syphilis, for instance, being included under the one heading of Syphilis. An additional variety will be noticed in the table of contents, namely delirium due to Gangrene; the reason for considering this form specially is, as will be more fully explained later on, that in cases of Gangrene the occurrence or absence of delirium forms a most important element in the prognosis. It is important to remember that this disorder of the mental functions is essentially a result of a weakened or disordered physical state; hence the drain upon the system due to excessive sweating or diarrhoea may excite delirium; so too delirium may be due to some local irritation, such as that arising from a badly adjusted splint, or to the physical discomfort consequent upon hypostatic congestion of the lungs due

to the lying posture, or to a distended bladder; the posibillity of its being the first sign of a Pneumonia must never be forgotten.

The variety of delirium most frequently brought under the notice of the hospital surgeon is that due to acute Alcoholism; I find that between 1st October 1894 and 1st April 1897, ninety of the cases admitted to Professor Annandale's Wards at the Royal Infirmary, Edinburgh, suffered at some time from delirium of such a kind as to require treatment in the special Ward ; of these ninety cases sixty-six, or three-quarters of the whole number were admitted suffering from acute Alcoholism; the second most frequent variety is that due to chronic Alcoholism, whilst next comes the delirium of septic infection, followed by that due to the Senile diathesis, after which in order of frequency comes the delirium due to the nervous diathethis. These are the only varieties of traumatic delirium that are at all frequently seen; all the others are rare, some of them extremely so. in support of these statements, I may say that of the 24 cases of delirium other than that of acute alcoholism, which occurred during the period under review, I have classified 10 as due to chronic alcoholism, six as due to septic infection, three as due to the Senile diathesis, two as due to the Nervous diathesis, while Malignant disease, Tubercular disease, and Pain each accounted for one of the three remaining cases. Passing now to consider

the actual frequency of delirium in surgical cases I find that during the period under review 2437 patients were treated and that 1424 of these were subjected to operation; among these patients, as I have already stated, 24 cases of delirium, other than that due to acute alcoholism and of such a nature as to require removal to the special ward, occurred; in other words ·99 % of all patients became delirious subsequently to admission; on considering ~~these~~ separately those submitted to operative treatment and those not so treated, I find that of the former 1·1% developed marked delirium and of the latter only ·78%; a surgical operation therefore may be regarded as to a slight extent an exciting cause of delirium; Vene after collecting statistics from a large number of sources fully corroborates this.; he finds that delirium occurs in 2% of all patients submitted to operation; in the practice of some surgeons it occurs in 2·5 % of cases or even more frequently. If we take into consideration also the minor forms of delirium, some of them are of a very transitory nature, we shall of course find the percentage increased; thus of the 530 patients, I was able to keep under continuous observation I found that 14 or 2·6% exhibited at some time or other some delirium ; of these 530 patients 300 were subjected to operation; of these 12 or 4·0 p.c. developed at any rate mild delirium; of those not subjected to operation only ·9% showed any signs of delirium. On comparing these figures

with those I have mentioned above it is at once evident that a surgical operation certainly contributes towards producing mild transitory delirium. It is interesting to consider what particular operation is most frequently followed by delirium; on this point there is an almost universal consensus of opinion, Paget, Erichsen, Ashurst, Keen, & White, Roswell Park and Treves all stating that Amputation of the Breast is the operation most frequently followed by mental disturbance. On careful examination I find that this statement is fully justified for on inquiring into 27 consecutive operations for Scirrhus of the Breast I find that two or 7·4 per cent subsequently became delirious; the only other special operation at all frequently ~~followed~~ followed by delirium is that for Hernia, three cases of delirium, or 3·7 per cent having occurred after 79 radical cures for hernia. It is generally said that the reason why Amputation of the Breast is so comparatively frequently followed by delirium is that the breast forms such an important element in the female affective life that any disease which affects it causes exceptional mental distress and is at the same time often concealed for an unusually long time; frequently therefore the patient submits to an operation which she regards ~~than~~ as nothing less than mutilation with her mental balance considerably disturbed, while the comparatively long duration of the disease has seriously impaired her physi-

cal strength. We must remember too that amputation of the breast is seldom, if ever, performed except for Malignant Disease, which is itself a contribing cause of delirium; further many of these operations are performed about the time of the menopause, a time when the mental equilibrium is extremely unstable; in some cases - and it was so in one of the two cases I have referred to - the senile diathesis acts as a predisposing cause.
It is interesting to note that both the cases recovered, Although nearly a century has elapsed since Dupuytren drew attention to the fact that the operation for the radical cure of hernia is comparatively frequently followed by delirium, the matter has attracted but little attention; indeed I am not aware that any writer except Vene has referred to it; When we come to inquire into the circumstances, however, we shall not be surprised to find that it is so. As I have already mentioned, delirium occurred three times after 79 operations for hernia, or in 3·7 per cent of cases. Of the three cases in which delirium occurred, one was irreducible and the two others were strangulated; an obvious explanation of the delirium therefore at once suggests itself, namely intestinal toxaemia, owing to the impossibility of a preliminary thorough evacuation of the bowels, an item in the preparatory treatment before operation upon which surgeons have ~~for some time~~ long laid great stress. On analysing the

cases this is still more obvious, for of the 79 cases 19 were irreducible, 17 being also strangulated; hence whilst 60 consecutive operations for uncomplicated hernia were never once followed by delirium mental disturbance resulted after three out of 19 operations for irreducible hernia; in two of the three cases the gut was found to be gangrenous at the time of the operation; neither of these cases recovered. The other case I have classified as chiefly due to the senile diathesis, and it is fully described in that section; in it there was complete recovery. I am not able to discover any other operation specially liable to be followed by delirium.

In some surgical diseases delirium frequently occurs; in others it is very rare; thus mental disturbance is always an outstanding feature in hydrophobia; in glanders it is very common; on the other hand it is so rarely seen in tetanus that many experienced surgeons deny the possibility of its occurrence.

I have already indicated that traumatic delirium is a subject of some importance; the reason why the delirium should interest us differs in the various varieties; thus in some conditions, as for instance Gangrene, the presence or absence of delirium forms an important element in the prognosis; in the case of uncomplicated senile delirium again it is useful to know that the delirium is of little or of no im-

port for evil; in other conditions, such as iodoform poisoning delirium is a synptom which is of much assistance in diagnosing the disease itself; in all cases the ultimate recovery of the patient is greatly influenced by the rational treatment of the delirium, and this is impossible without a clear understanding of all the different varieties.
With regard to the diagnosis of delirium as such, there is little to be said, the mental disturbance being usually obvious; it is more difficult but of paramount importance with a view to rational and successful treatment to ascertain the cause or causes of delirium; for this a knowledge of the family and personal history is advisable, in order to decide how far one of the diatheses is a predisposing cause; we must next inquire as to whether the cause is an organismal poison, and in a large number of cases we shall find delirium to be septic in origin; it must further be considered whether some non-organismal poison is a contributing factor; this inquiry is most important as iodoform is a potent and not infrequent cause; besides iodoform other antiseptic lotions have on rare occasions caused physical and even mental disturbance; it is necessary therefore in all doubtful cases to know exactly what lotions and dressings have been used, and I think it will be advisable that I should now describe briefly the antiseptic treatment adopted

before and after operation in the cases I have described in this thesis; after careful washing with soap and water a 1 to 40 carbolic poultice was applied over the area to be operated on, and kept on for about 12 hours, being changed once during that time; at the time of the operation 1 to 40 carbolic lotion was used throughout; in the case of abdominal operations, and operations on the face and cranium, boracic lotion only was used at the time of the operation; no iodoform was used except in those cases where special mention is made of the fact; in the subsequent treatment gauze wrung out of 1 to 40 carbolic lotion was used for dressing. Chloroform was the anaesthetic. It must next be considered ..... whether the delirium is uraemic or stercoraemic in origin, and in this respect I may state that in all the cases, unless special mention to the contrary is made, the urine was previously examined and found to be healthy while the bowels were thoroughly evacuated before the operation. The possibility of a syphilitic or malignant origin will next be considered, and then we think of shock, hemmorhage and pain as possible causes. We then think of injury or disease of special organs or regions and finally we must not omit to consider whether it is the delirium preceding death; this latter is a most important consideration and must always be kept in mind. There are often premonitary symptoms which it is important to recognise, for not infrequently

an impending attack of delirium may be warded off if appropriate treatment is adopted in time; the most important premonitory sign is Insomnia, and this is a symptom which urgently calls for treatment after operation, especially if the patient be well up in years; other premonitory signs are loss of appetite, restlessness and a curious subjective symptoms, namely a fear of impending delirium; on three occasions patients who were suffering from insomnia told me that they were afraid they were "going offtheir heads", and in each case they shortly afterwards did so; Maclagan mentions as a premonitory sign a curious wild look in the patient's eyes which cannot well be described, but once recognised is extremely useful as a guide; this is noticed more particularly in the maniacal forms of delirium, but is not usually observed till a mental storm is imminent: these premonitory signs .. should never be ignored; they call at once for appropriate treatment in the manner to be presently described. The value of being on the watch for premonitory symptoms and at once on their appearance adopting precautionary measures becomes evident when we consider that delirium seldom occurs immediately after operation. With regard to the time at which delirium actually occurs, I find that it may occur at any time within 16 days after the operation; from the 4th to the 8th day is the most common time of incidence; it rarely occurs before

the third day; in one case, where the delirium was presumably due to chloroform, mental disturbance was noted immediately consciousness returned after the administration of the anaesthetic; in another case where sepsis, previous to the operation, and chronic alcoholism contributed to the delirium there was marked exaltation 8 hours after the operation. It is less rare but still far from common for delirium to occur after the eighth day; in one senile case there was no actual delirium till 16 days after the operation, though for 7 days previously insomnia had been very troublesome; in another case, due to iodoform poisoning, delirium did not occur till the 15th day, but as the amount of iodoform that was being used was not excessive we should scarcely have expected an earlier development. The duration of the delirium varies; it usually lasts from one to 4 days; in one case - that due to chloroform - there was great excitement which suddenly abated after lasting only two hours. Such a speedy termination in recovery is not common if the delirium is active but mild transitory delirium is sometimes of even shorter duration; delirium sometimes continues for as long as 8 days, but seldom for longer, as it is difficult to sustain life under such circumstances. When delirium persists for weeks and even months, the case comes to be classified as one of insanity; in insanity so developed the prognosis is bad. I

have seen a case recover after 24 days of delirium and in two other cases delirium persisted for three months; one of these was a case of malignant disease to be presently described in that section, in which death was the ultimate issue; the other case where mental disturbance was due to chronic alcoholism and sepsis and which will be described on the section on chronic alcoholism, was in many respects very remarkable; the delirium itself was of an interesting character, but most intractable; it was considered to be of the ~~character~~ nature of senile dementia and little if any hope was entertained of restoring mental health; the consent of the friends was obtained for thepatient's removal to an asylum, but before the necessary arrangements could be made he agreeably surprised every one by making a complete recovery.

In the Preliminary I have already drawn attention to Richardson's theory that physical disease may be diagnosed by the character of the delirium it excites; Gowers is of opinion that there is "rarely anything in the character of delirium to show to what it is due" and I am afraid we must admit that he is right; still there are some conditions in which Richardson's proposition holds good; perhaps the condition most generally recognised as typical is that seen in delirium tremens of which I can give no better description than to quote from Ashurst "the trembling, watchful, wakeful, sus-

picious, cowardly busy subject of an attack of delirium tremens is almost too well known to need description. His hallucinations are without number. He sees rats, rams, snakes, monkeys, cats, bats, bugs, spiders, mice, lice, imps, demons and furies, dances and devils, - but not often angels as the illusions are rarely pleasant" Another mental type that must be at once familiar to many surgeons is what Richardson himself has classified as "Delirium Desperans", due to local disease of the lower bowel; "the characteristic of it is depression, gloom, coupled sometimes with acerbity, reaching to actual dislike of any person or act or thing which gives real or imaginary offence. In most instances the delirium extends to despair, with a recklessness as to life but without suicidal proclivities, and even a desire to die, rather than live unless relief can be obtained". In the section on the senile diathesis I shall point out that the typical delirium may possibly be appropriately styled a" delirium of old times", a term which I think sufficiently explains itself; the delirium preceding death is similar in nature. Again I shall try to show that "delirium of occupation" indicates the nature of the mental confusion in chronic alcoholism; certain cases recently drawn attention to by Miles seem to show that a similar delirium is seen in cases of severe head injury where there is some lesion of the occipital lobes. Raymond after studying a number of cases of mental disturbance due to renal

disorder arrived at the conclusion that the characteristic of such cases is mania alternating with melancholia, with hallucinations of sight and hearing. On the other hand illusions are common in the delirium to which those of a neurotic temperament are liable. In septic cases it has been noticed that there is a loss of the sense of locality and a wish to go home.

Passing now to consider the question of treatment it may at once be said that the only rational and certain method is to ascertain the cause and remove it; it cannot be too often repeated that the cause may be very trivial; carful examination should always be made to see there is no source of local irritation, such as a badly adjusted or insufficiently padded splint; if the excitement is due to hypostatic congestion, due to the lying posture, a change of position is at once indicated; if there is excessive purging the diet must be regulated, and astringent or sedative medicines must be administered; if there is excessive sweating, the bed clothes must be lightened and stimulating or astringent medicines given; and an examination should be made to see whether the mental distress is due to a distended bladder. The method of treating each special variety of delirium will be fully considered in the various sections; there are, however, certain general principles in treatment applicable to many forms which it will now be well to consider, especially as

we have to rely on them entirely in those cases in which it is impossible to decide at first what exactly is the cause of delirium. Sometimes delirium is partially, if not entirely due to being in a dark room, and it is therefore well in all cases to try the effect of turning on the light; by this simple treatment most gratifying results are sometimes obtained; this is especially the case in the delirium preceding death, which often requires no further treatment, the excitement rapidly passing off and giving place later to a condition of coma.; I have seen more than one case so relieved without the patient incurring the opprobrium of removal to the special ward. One of the first points to consider, at any rate in hospital, is whether it is necessary to remove the patient to the special ward; it is necessary to do so, if he is dangerous to himself or his neighbours, or if he is so noisy as to disturb others, or if he is so restless that he cannot be kept in bed when rest in bed is absolutely necessary; it will often be observed that the mere fact of removal to the special ward has a great moral effect and there is often no further trouble; if there is it may be necessary to use some restraint; if it is merely necessary to keep the patient in bed, some movement being permissible, padded leather wristlets secured to the bed may be applied and in addition anklets if really necessary; if further restraint is re-

quired a sheet may be passed tightly over the patient and secured beneath the bed on each side; in the case of fractures where it is necessary to keep a limb at rest, the limb must be firmly fixed to splints bound to the trunk in such a way that it moves as a whole with the rest of the body; there must never be a rigid apparatus fixed to the bed; the ordinary long splint, single or double, will be found most efficacious; sometimes securing the limb to a pillow will be found sufficient; it must always be borne in mind that no restraint must be applied unless absolutely necessary for the patient's safety; it must be applied as lightly as possible, and discontinued directly the excitement ceases; anything in the way of control that is unnecessary only increases the irritability and unrest. Much may be done by kind but firm moral treatment, and often the mere exhibition of some means of restraint will answer the purpose. Having decided the question of restraint we reflect ~~we reflect~~ that the prime indications are to give rest and strength; thus sleep if absent must be induced and stimulants administered if there is the least sign of feebleness. For sleep there is no drug so efficacious as alcohol; two drachms or half-an-ounce of whiskey in hot water or milk and repeated in one or two hours, if necessary, often acts like a charm; it scarcely ever increases the irritability, but on the contrary soothes the nervous system and at the same time supplies the

necessary stimulation; failing alcohol Bromide and Chloral in 20 and 30 grain doses respectively are often useful; Bromidia in 1 drachm doses often does well; Opium is sometimes useful, but is in many cases contra indicated, as it disturbs the digestion and increases the tendency to sweating; Hyoscine sometimes acts well, but frequently fails and it is too depressing to be safe in many cases; Paraldehyde and Sulphonal are occasionally serviceable; it will often be found that if one drug fails, some other will produce the desired effect, and it is therefore desirable to keep several in mind; even when a sedative acts well it is often good treatment to substitute for it some other after a time, as in prolonged cases, the effect of any particular drug often gradually diminishes. If there is very great excitement hyoscine is probably the best drug; it should be given hypodermically in $\frac{1}{100}$ or $\frac{1}{50}$ grain doses; sometimes it is necessary to give chloroform. With a view to stimulation alcohol is of great value; It may be given in 2 or 4 drachm doses three times a day or even more frequently; other stimulants, such as strychnine, digitalis, carbonate of ammonia, are sometimes indicated. Food must be given as liberablly as possible; of course at first after an operation little or no food can be given, and the food at first must be mainly if not entirely in liquid form; as soon, however, as the

patient is able to take it, such food should be given as freely as possible, small quantities frequently repeated, say every 4 hours, or every 2 hours, according to the exigencies of the case. Sometimes it will be necessary to give a little every hour. We may sometimes help to calm the nervous storm by such means as cupping at the back of the neck, applying an ice bag to the head, or a hot mustard foot bath given in bed. Similar treatment is required for any premonitory signs that may be obseved; if care is taken that the patient sleeps well and feeds well, taking alcohol if necessary from the time of the operation many impending attacks may be averted.

With regard to prognosis Vene states that it is good most cases recovering; I do not think I can agree with him, as I find that out of 25 cases I observed 9 died; this applies to cases of all varieties; the special prognosis in any particular kind will be fully considered later.

Of the various causes which predispose to dilirium after surgical operations none exercise a more potent influence than the senile condition; in support of this statement I can say that it is based on a careful investigation of 300 consecutive operations in ~~the~~ hospital; I find that in 14 or 4·2 per cent of these cases delirium of various kinds develops subsequently to operation and that while none of the 176 patients under 35 years of age ever showed any signs of mental disturbance, 7 of the 36 over 60 years of age or 19·4 per cent showed such signs. The youngest patient who became delirious was 36 years old; in each decade after 35 there is a steadily increasing ratio in the proportion of those who do; this is well brought out by the following figures; - delirium occurred

between 35 and 45, 3 times in 44 cases or in 6·8 p.c.
" 45 and 55, 3 " " 32 " " " 9·3 p.c.
" 55 and 65, 3 " " 25 " " " 12 p.c.
" 65 and 75, 5 " " 23 " " " 21·7 p.c.

Only two of the patients subjected to ~~the~~ operation were over 75; one of these died two days later apparently from syncope; I can therefore give no figures showing the frequency of delirium after this age but there is every reason to think that it would be found to be still more frequent, especially as I find that of 7 patients between 70 and 75, 2 or 28·5 per cent became delirious.

It is interesting to notice that though the tendency to delirium after a surgical operation rapidly increases as age advances the element which the actual occurrence of delirium forms in the prognosis becomes at the same time less and less grave. Of the 14 cases of delirium to which I have referred, ten were fatal and 4 recovered; all those who recovered were over 60 years of age; in other words when delirium occurs after a surgical operation in a patient under 60 it very frequently ushers in a fatal issue, but when it occurs in a patient over 60 it only does so in 57·1 per cent of cases ; this latter statement may perhaps cause surprise as it is contrary to what has usually been stated on this subject, thus Roswell Park in his treatise on surgery in speaking of post-operative mania, says, "It is rather with adults in the later decades of life, with more or less sclerosed arteries and faulty excretion that one feels most apprehension". I believe, however, that what I have stated is correct and that on careful consideration it will be seen to be not contrary to what we might expect; it must be remembered that to cause post-operative delirium in a young adult some very grave complication such as extensive septic infection or serious auto-infection in the form, say, of uraemia must usually be present; a complication of so serious a nature must at any age be very dangerous to life; on the other hand in those advanced in years a very slight compli-

cation will induce marked nervous symptoms - a complication often so slight as not to seriously endanger life in any one - while in some cases of which I shall presently give illustrations, the senile condition alone without any other complication may cause post-operative delirium. It is worthy of note that something similar to what I have just stated has been observed in cases of senile insanity; thus Clouston in his text book on mental diseases when discussing this condition, says, "The striking fact is the number of recoveries". I have already stated that the senile condition alone may give rise to post-operative delirium; I believe it did so after 3 of the 300 operations I have been referring to. I must admit that in one of these cases there was a slight amount of localised suppuration, but I cannot think it was sufficient to cause any constitutional symptoms, and that in another - a case of irreducible hernia - the bowels were not moved for 7 days, so that auto-intoxication from putrefaction ~~from~~ of intestinal contents could not be entirely excluded; in the third case there was no complication of any kind; in all three cases I saw the patients' relatives, and in two of them also the usual medical attendant and inquired carefully into the family and personal history as I was anxious to exclude all the commoner causes of nervous disturbance. I am convinced that in two of the cases the senile condition was the chief if not the only cause of delirium and that in

the third no other cause was present. I shall give a brief record of this last case.

A.C. aet. 69, widow, was admitted to hospital suffering from epithelioma of the lip; she looked old and feeble but on examination all the organs were found to be healthy; the family history was good as had also been the previous health ; after the usual preliminary attention to the bowels the necessary operation was performed under chloroform, boracic lotion only being used as also in the subsequent treatment. That night the patient slept well and during the two following days progressed so well that she was able to get up on the third day; on the fourth day after operation she was noticed to be a little peculiar in manner; she seemed much depressed and at times forgot where she was; as a condition of cerebral Anaemia was suspected the wound being perfectly healthy, she was ordered one ounce of whisky twice daily; the first dose quite restored her mental balance, but towards night she again became peculiar and attempted to get out of the window to reach her son who she said was ill in the next room; she was then easily restrained, and was put to bed, an extra dose of whisky being given; the same night I was called to see her at 2 a.m., as the nurses could not keep her in bed; she was much depressed, moaning and wringing her hands; she knew she was in hospital and who those around her were, but had a

delusion that her son was ill in the next room; she was very anxious to see her; I endeavoured to assure her that her son was doing well and that she had better wait to see him till the morning; in spite of all we could say, however, she struggled hard to get out of the window in order to reach her son, and I was obliged to order her removal to the special ward; there, as so frequently happens in such cases, she at once became quieter; for the two following days she continued much depressed and was constantly worrying about her son, but was easily managed; treatment by alcohol was continued; she slept moderately well; on the third day her relations insisted on taking her home, and were allowed to do so, the wound being healthy and almost quite healed; at home she rapidly recovered. Six months later she was perfectly well, having had no return of the delirium It is interesting to note that one of the patient's sons died in hospital five years previously; she was much upset by his death and evidently in her delirium was carried back in thought to that trying time.

Another example of senile delirium is the following: A.J. aet. 74 Mason, married, habits temperate, previous health good, family history good, a healthy-looking old man; on examination all the internal organs were found to be healthy, except that the arteries were slightly atheromatous ; for fifteen

years he had suffered from a hernia for which he had worn a truss; three days before admission the hernia came down and could not be reduced. Immediately after admission the hernia being found to be irreducible, the necessary operation for radical cure was done under chloroform, boracic acid only being used at the operation; the gut was found to be quite healthy; subsequent progress was satisfactory till the third night after the operation when he became peculiar in manner being slightly excited and saying he must get up and go home; he did not know where he was and could not recognise those about him; during the night he twice got up and pulled all his dressings off, which acts he could not afterwards remember; at 11 the next morning he again got up and was got back to bed with such difficulty that it was considered safer to remove him to the special ward; there he became quiet but could not remember any recent events. In the evening he again became slightly excited; he remembered nothing about the operation till I showed him the bandages when he said he knew something had been done to him without his consent and he would make a row about it. At midnight excitement and exaltation were marked; he was recognising every one as an old friend to whom he at once assigned a name and was talking freely about his home and friends. He had had 20 grains of potassium bromide with 30 grains of chloral hydrate at 9 p.m. and this had just been repeated. At

2 a.m. I was called to him as he was much excited and had got out of bed in spite of his hands being secured; he was very noisy; he then had $\frac{1}{100}$ gr. hyoscine after which he slept well. The next day he was quiet; he said he was quite well, had had no operation, but was staying here - he seemed to think he was in a hotel - for the purpose of visiting his old friends. That night he had a dose of aperient medicine which acted well the following day; he slept well after $\frac{1}{100}$ gr. of hyocine; the next day he was quiet but very mysterious in manner; he knew where he was and who I was and insisted on speaking to me privately; he then told me that he was not safe in that ward as the man in charge wanted to murder him and begged me not to leave him there; I endeavoured to re-assure him but without much success; apparently this last development was a sort of exacerbation prior to recovery for the same evening he was quiet and rational - said he remembered the operation and that he had been very ill on that day; he slept that night without any hypnotics; for the next 12 days his condition was quite satisfactory; he slept well every night after half an ounce of whisky in hot milk; he then again became sleepless but as before this was overcome by hyoscine; as a return of the restlessness seemed to show that longer confinement to bed would not be wise, he was got up for a short time the next day; in spite of this he

was sleepless and excitable at night and a dose of hyoscine only aggravated this condition; the following day he was accordingly got up for the whole day with the result that he slept well at night. He was discharged the next day; the wound had healed by the first intention; at home he rapidly regained his former health and six months later was reported quite well.

As regards the type of delirium in these senile cases I am afraid I have not yet seen a sufficient number to form a definite opinion, but I would suggest that it may be found to be a delirium of old times; in one of the cases I have recorded the patient was entirely absorbed in thinking of and endeavouring to reach a person who died five years previously; in the other case the patient though not living entirely in the past, talked a great deal about and often imagined he was with old friends. Keen has pointed out that there is often a delirium of suspecion in these cases; this may frequently be observed.

Let us now consider the cause of senile delirium; Sawyer in his lectures on Insomnia when speaking of senile insomnia says that it is "mainly if not entirely the result of senile degeneration of the ... smaller cerebral arteries; these vessels are less elastic and less contractile than in health and their weakened walls often lead to their permanent dilatation; they are physically unable to adapt themselves

themselves fully to the condition of relative arterial anaemia which is requisite for healthy sleep; this is counteracted partly by the cardiac feebleness which also exists," this quite explains the insomnia which is so troublesome in these cases and if we elaborate Sawyer's statement a little and say that while it is difficult to get the condition of relative arterial anaemia requisite for sleep it is also difficult owing to the loss of elasticity in the veins and the feeble heart to get the condition of relative arterial hypernemia requisite for healthy mentalization; we have at once also an explanation of the delirium. As Sawyer points out the above unhealthy condition of the cerebral vessel not infrequently exists when there is no other sign of atheroma.. As long as an elderly person can lead a perfectly healthy life, this tendency to senile delirium may remain latent, but subject him to the excitement of a surgical operation and all the change of life and surroundings such a proceeding involves and it at once becomes a great potentiality for evil.

Treatment: In these cases unfortunately, treatment is very unsatisfactory; none of the hypnotics act well; opium is not advisable because it disturbs the digestion and checks the secretions. (Jenner) Hyoscine as I have shown occasionally acts well but it is too depressing to be safe in many of these cases and the same may be said of most sedatives; I have

often noticed that in cases of insomnia, but especially in these senile ones, that a sedative will act once or twice and then on the following night fail, while a moderate dose of a fresh one will produce the desired result; remembering this, we may ring the changes on Bromidia, Sulphonal, Hyoscine, Trional, etc. The best hypnotic of all in these cases is undoubtedly alcohol; this is the opinion both of Sawyer and Macfarlane and Clouston endorses it, though not so enthusiastically; half an omce or an ounce of whisky, in hot water or better hot milk may be given about 10 p.m. and repeated in an hour if necessary; unfortunately, however, it is far from a specific. Stimulants should also be given during the day if they seem to be required and they generally are in these cases; I do not think alcohol will ever be found in these cases to increase the mental disturbance; on the contrary it nearly always allays nervous irritation and soothes the nervous system, though how it acts is not certainly known. (Gull)). The great indication in treatment is to get the patient up out of bed as soon as possible, and let him resume his ordinary habits among his ordinary surroundings; fresh air and food are all important. I believe many of these cases could be avoided or at any rate tided over with little trouble if we could only get the patient out of doors for a time every day; this was tried in one case and the result was most gratifying; the patient, a married

woman, 62 years old, of previous good health and temperate habits, was operated on for a scirrhus cancer of the breast, from which she had suffered for two years; a little localised suppuration occurred in the wound, but not sufficient to cause any constitutional disturbance under otherwise normal conditions; by the 14th day the wound was quite healthy; during this time there had been considerable insomnia, which was very troublesome though sometimes yielding to Bromidia, sometimes to Morphia, and sometimes to Tironal; she was then put on whisky and slept well the next two nights; the following night she was very restless; Whisky, Hyoscine, Bromide and Chloral all failed to keep her still and she twice pulled off the dressings during the night; she made no noise and was quite rational when spoken to; she said she felt at night as if she were going off her head, a statement by-the-by- which when volunteered by a patient not infrequently indicates that an acute attack of delirium is impending; she said that when she pulled the dressings off she thought she was in a flower garden picking flowers and was afraid she would be accused of stealing them; the next day she was got up, and the day being fortunately fine and warm, although in winter, she was, ~~got up~~ after being well wrapped up, taken to sit on the balcony outside the ward for an hour in the middle of the day; as a result of this she slept well that night; the next day she was taken out for a short

walk, and again slept well; she left hospital shortly afterwards quite well, and has remained so for 6 months except for a slight attack of Influenza.

Prognosis. The prognosis as to ultimate recovery in these cases is good, all the cases I have seen, in which the only obvious predisposing cause was the Senile condition, recovered.

THE NERVOUS DIATHESIS.

I shall often have occasion to refer to the influence of a neurotic taint in producing delirium and it is right that I should now consider more fully this condition, and its possible effects on those who are placed under surgical treatment. We are all familiar with the nervous patient, who is typically small in stature and figure, with finely cut features, bright eyes , small hands and feet; such an one is hyper-sensitive, thinks and acts quickly and is often wonderfully clear in his judgment; there are innumerable variations from the fundamental type, but there is one feature common to them all, and that is they are never fat. The nervous functions in such people are very active and dominate the other functions: in virtue of their temperament they suffer from diseases peculiar to themselves, while the progress of ordinary disease in them is much modified; their mental balance is comparatively easily upset, and during an acute disease, especially if there be any pyrexia, they are very apt to become delirious. I include in this class those patients who were described by the older writers as hysterical, as I think it is now generally considered that while hysteria may, in certain instances have as its exciting cause some definite pathological lesion, yet its manifestations both in these cases and also in those in

which there is no lesion ascertainable by our present methods, have as their predisposing and principle cause the neurotic taint. Patients of this class then after injuries and surgical operations are liable to suffer from what Walsham and also Brinton term "traumatic nervous delirium", a condition referred to by Keen and White as "delirium nervosum"; the delirium is often sudden of invasion and is usually of a quiet kind; in rare cases it may assume a violent or maniacal character; according to Brinton it is attended with mental hallucinations of almost every sort; I think however, that illusions rather than hallucinations are characteristic of this delirium, the illusions curiously enough often being recognised by the patient as such; Professor Grainger Stewart in his lectures describes an imaginary case of a patient lying in bed and watching a long crack in the wall round which he lets his fancy play; he will make believe that the crack is a ravine, and that the spots on either side are the units of opposing armies; he will make them move and as they advance and retire he will see their helmets glittering in the sun and as the contest becomes keener, he may shout to urge them on, yet ~~all~~ the while he knows it is but a fantasy. I have seen such patients as evening comes on and there is perhaps a little rise of temperature become wonderfully bright and talkative, and then

perhaps they will begin to sing quietly to themselves; they will tell you that you might perhaps think they were going off their heads - but that they are all right ;- that they could stop singing if they wanted to, but it pleases them to do so; such a state is really a mild delirium; they are suffering from mental exaltation but they have not lost their self- control; such cases are seldom seen in hospital; they occur rather among the educated and professional classes. Delirium frequently occurs in these patients on waking, it may be during the night, and the ideas are often suggested by some object that catches their eye ; such a condition occurred in a medical student, who was operated on for Varicocele; the second night after the operation he was wakeful, sleeping only at intervals; once on waking he sat up in bed, stared fixedly across the room, then suddenly sprang up and began to walk towards the opposite side. The patient in the next bed called out to him, and he stopped, looked a little dazed, then seemed to recollect himself and crawled back to bed; He then explained that on waking he could not remember where he was, or what had happened; that a portmanteau on the opposite side of the room profusely labelled had caught his eye, and at once the idea occurred to him that he was at a railway station and had to catch a train, which he

was attempting to do when called to himself. This false association of ideas with an object really seen is characteristic of these cases. The extent to which those who exhibit signs of the neurotic diathesis are victims of their temperaments varies greatly; so far I have spoken rather of those who are only slightly tainted, but I must now refer to the more deeply branded, whose mental workings may be quite upset by stress of circumstances. With fair breezes they may sail over life's sea without ever deserting the shores of sanity; but let foul weather overtake them and they are ..... stranded on the opposite side; to this class I believe belong nearly all these cases that are reported as "post-operative insanity"; take, for instance the case described by Birch.

J.K. Middle-aged farmer; previous health good: got the front part of his foot caught in a thrashing machine and had to have the foot amputated the same day. On the fifth day the wound began to slough; for the next few days the temperature was up to 100·3 or 101·7; the pulse was very intermittent and irregular; he was stimulated, getting three glasses of port daily. On the 9th day after the operation he was better and the wound was then healthy and granulating; the next day he was noticed to have delusions; he thought he was driving horses; for the next five weeks he suffered from

mania; he had a dread of being poisoned, but was wonderfully "cute"; then he became religious, then obscene. The delusions lasted till the forty-sixth day after the operation; he then said he had gone through a good deal, but was better. He gradually recovered. His paternal uncle was at one time so despondent that he had to have a male attendant, but he ultimately recovered. In this last note about the family history we have the key to the whole situation; no doubt the chloroform, the septic absorption, and other causes may have contributed to the mental disturbance, but I regard the hereditary taint as the prime cause. I think, considering the obvious physical causes, and how soon the mental storm abated, such a case is one of delirium rather than insanity; and I think it is unjust to surgery to classify such a case as post-operative insanity. This was done, as I think, incorrectly, in the following case.

Mrs. G. aet. 48. Previous health and family history good, says, however, she has always been a nervous woman, suffering from scirrhus of the breast. The usual operation was performed; at the time some carbolized gauze, sprinkled with a little iodoform was introduced as a drain; this was removed on the second day after the operation, and no more iodoform was used; the wound healed by the first intention and there was never any rise of tempera-

ture; on the 6th day after operation the patient who had previously been at night a little excited and restless became very noisy; she had to be removed to the special ward; when there she created considerable disturbance; she alternately sang hymns and used the most obscene language; she pulled off her dressings and several times attempted to get up. As she remained in a very excited state she was removed a week later to the asylum. At the asylum she made a rapid recovery, being discharged in 26 days quite well; at the asylum the case was classified as one of post-operative mania..... ..... should it have been so? ..... In this case I had the opportunity of observing the patient for several days before the operation, and I at the that time made a note to the effect that she was peculiar in manner, appearance and conversation; she was slightly erotic , very religious, and emotional; she was constantly anxious to speak to those in attendance privately about trifles. Now these are facts distinctly suggestive of insanity; was not this patient really insane all the time, the insanity having the nervous diathesis as its predisposing cause and malignant disease as its exciting cause ? Of course the insanity was temporarily aggravated by the shock of the operation, but at the same time it was ultimately cured, and that extremely rapidly by the removal of the exciting cause. I certainly regard such a case as one of pre-existing but unrecognised insanity,

in which, by a surgical operation, a permanent cure, after a temporary exacerbation of the mental symptoms, was effected. Such cases I believe form the greater number of the so-called cases of Post-operative insanity; these cases have usually been described and reported by the alienists, who have sometimes made out that the insanity is the result of surgical treatment; it is not so; certainly an operation will nearly always aggravate for a time the mental disturbance, but it is often the means by which it is ultimately entirely got rid of. A somewhat similar view has been expressed by Collins, who says "Major operations are sometimes, though rarely followed by mania". This may be merely a coincidence but I strongly suspect when it does supervene that the patients were already the subjects of a deep derangement of the affective life, or of some obscure insane temperament". Of course in these cases, if it seems probable that an acute attack of insanity is impending it would be wise to defer the operation if possible till the general condition has been improved, because such a catastrophe will make the after-treatment at times most difficult, and may even prevent its being satisfactorily carried-out. If we consider the great difficulty in many cases of diagnosing even advanced insanity, and if we remember how gradual is the transition from sanity to insanity, so that of a neurotic patient who may say when he has crossed

the Rubicon we shall not be surprised that sometimes cases occur in which the first noticed indication of the mental state is the outbreak after operation; we must remember too that in the case of patients admitted to hospital there is a further difficulty in that any insane state will almost certainly be greatly benefitted by the change and especially by the change to the regular life of an institution, while at the same time they are specially on their guard not to make any false step. It is right ~~that~~ when after operation the mental condition in such cases continues for some time to give the chief call for treatment, that they should be removed to an asylum, but I do not think it is fair to surgery that they should all be classified as cases of post-operative insanity. Whatever may be the opinion as to the treatment required by such patients at ordinary times, there is no doubt that when under surgical treatment they require stimulating by alcohol. Their nervous system must be temporarily strengthened for the trial it is ill-fitted to bear. The insomnia must be treated by sedatives, of which however only the less powerful are usually required, and those often only in small doses. Trional in 15 gr. doses acts very well, and has not, as far as I have been able to judge any ultimate bad effects.; it is only very slightly depressing, does not upset the digestive

system , and is not likely to develop a habit. Morphia must be cautiously administered to such patients; for them it has a fatal fascination; their keen susceptibility to pain, however, often makes its use imperative.

I do not think we can agree with Brinton that the prognosis in such cases is bad; I think a little mild delirium in such patients is of no import, and even mre serious cases rapidly recover; probably Paget was right when he said that after operations "the nervous do well; they are afraid before but hopeful after."

CHRONIC ALCOHOLISM.

A considerable proportion of patients who are placed under surgical treatment suffer more or less from a condition of chronic alcoholism; in some instances this condition may not affect the progress of the case; a large number of such patients, however, are troubled by restlessness, insomnia, and mild delirium, and occasionally there is great exacerbation of these symptoms, the patient falling a victim to an ordinary attack of delirium tremens; these complications when they arise have often an unfortunate effect on the progress; for instance the restlessness may be the cause of mal-union, or even non-union in a fracture which under ordinary circumstances might have united well, and when it occurs after an important operation, may be productive of even more serious harm. The history of an ordinary case, and the dangers to which the patient is exposed are well illustrated by the following record: -

J.A. aet. 46. Labourer in a Brewery, was admitted to hospital suffering from a simple fracture of the upper third of the femur, caused by a waggon overturning, striking him on the back, and knocking him down. He had always enjoyed good health; his account of his habits was rather humorous; he said he could always get beer to drink at the Brewery and drank a good deal, though "not so much

as he might"; he seldom touches spirits chiefly because the nearest public house is two miles distant from his home. The fracture was set and extension applied and the limb secured in short and long splints. Progress was satisfactory till the sixth day; on that day I was called to the patient at 3.a.m., as he had slipped the long splint out of the binder and pulled off two of the short splints and a great deal of the padding. The splints etc. were re-adjusted, the patient, who had complained the previous night of unpleasant dreams said he had been dreaming again, and must have taken the splints off then as he only remembered waking up and finding the nurse at his side, with two splints which she said he had removed; he appeared rational ; there were no tremors and no signs of restlessness. The nurse said that she thought he had been awake all the time, and that at any rate he had picked out some of the padding while awake; she said that at intervals he had been laughing to himself. The patient was given 2 drachms of bromidia after which he slept well; during the following day his condition was quite normal, but at midnight I saw him pulling at his splints; he was apparently asleep; he did not waken when spoken to and his hands were moved and placed folded on his chest without waking him; he then remained quiet; he had not displaced the splints at all. There was never any restlessness

noticed again, but three days later the splints were found to be loose and had to be re-applied. For a week he was given 2 drachms of Bromidia regularly at 8 p.m., and he said he never dreamt after this; he said the dreams had frightened him, being such as to make him feel he was in a strange place without friends. When he was discharged from hospital the union was good, but iunfortunately there was a certain amount of mal-position; six months later the deformity was less marked, though still sufficient to interfere slightly with the use of the limb; it was hoped however, that this would gradually return.

The record of this case brings out one or two instructive points; one of these is the excellent results obtained by the administration of bromidia in this form of delirium; another is the fact that restlessness did not develop till the 6th day after the accident; this latter fact may usually be noticed in similar cases; when the victim of chromic alcoholism is suddenly confined to bed by an accident or for other surgical treatment nervous irritability is seldom noticed for the first few days; it generally occurs from the third to the sixth day, or even later and it is at these times too usually that the exacerbation or variety of mania, known as delirium tremens occurs. It is evident therefore that in the majority of these cases there is a reasonable amount of time during

which pro-phyllactic treatment may be adapted; I believe that there is a very efficient form of such treatment available, and that by pursuing it as a matter of routine, in the case of all chronic alcoholics confined to bed for surgical treatment, in a considerable proportion at least, it is possible to avert any unfortunate consequences of the previous indulgence. It is difficult often to obtain a history of chronic alcoholism, and sometimes there are no obvious signs of the conditions; when the patient is being anaesthetised however, we are often furnished with an important clue; the manner in which a chronic alcoholic struggles when passing under the influence of chloroform is so characteristic that we are quite justified in suspecting the unfortunate taint, although I believe that in a certain limited number of instances this excitement may be due to other causes; I have also noticed in such cases a fact which I am not aware of having seen recorded elsewhere, and that is that chronic alcoholics never vomit either during or after the administration of chloroform; as vomiting occurs only in a certain number of patients who are chloroformed this cannot be of much value as a diagnostic sign; the recognition however of the invariable absence of nausea in these cases justifies us in administering drugs to such patients much sooner than we would venture to do in ordinary cases.

The prophylactic treatment I would suggest is the regular daily administration of mild aperient and also sedative medicines; any ordinary aperient will do, Henry's solution of Magnesia being one of the best; many sedatives have been suggested and used in these cases; I believe, however , that Bromide and Chloral are the most valuable and that they act best when given in that combination known as Bromidia; indeed in Bromidia I believe we have what is almost a specific in these cases; it may be given in 1 drachm doses, but two drachms are generally indicated in the case of a male adult; this should be given regularly every night about 8. p.m., should the patient subsequently remain restless or unable to sleep another drachm may be given with advantage a couple of hours later; this treatment should be continued for a week and then stopped, but should be at once renewed if there is the slightest indication for doing so. I have used this prophilactic treatment in several cases where there was evidently an alcoholic tendency, and since adopting it have never seen any nervous symptoms develop. I have tried many other drugs, but have not found anything else act so well; opium sometimes fails, and occasionally seems to actually increase the delirium; the same may be said of hyoscine, even when given in $\frac{1}{50}$ of a grain dose; it must be remembered too that the use of hyoscine is very risky in these cases as the heart is often not quite healthy

Sulphonal is not of more value and trional is useless. A much more important drug is alcohol, which should always be given when the pulse and general condition indicate that stimulants are required; even when not indicated in this way it will often be found to be a valuable soporific. Curiously enough ~~the~~ its administration does not aggravate the nervous derangement.

With regard to the treatment of delirium tremens, I have nothing special to say; it is usually treated at the present time by the administration of bromide and chloral, 20 grs. of potassium bromide and 30 of chloral hydrate repeated every 4 hours till sleep is obtained, the patient being carefully watched to see that repeated does may be safely administered; the importance of food , chiefly in fluid form, and the necessity of careful watching owing to the danger of suicide must be kept in mind; usually, however, a little firm moral treatment is all the restraint that is necessary; if there is the least sign of cardiac weakness alcohol must be at once administered, and also other stimulants such as digitalis, strophanthus, and best of all Strychnine.

With regard to the character of the delirium typical of chronic alcoholism, I believe it will often be found to be "a delirium of occupation"; for instance a coachman who was markedly alcoholic became greatly excited in the early stages of chloroform administration and also afterwards in returning to consciouness;

in his excitment he was obviously holding the reins and driving a team of horses to whom he shouted from time to time in sporting language; I have seen such delirium twice in men whose work was with horses, and who were addicted to alcohol; Hunt says it is common and he gives other instances of a delirium of occupation, pointing out that a business man is always talking of the market, a stockbroker of stocks, and so on. Dr. Edwin Byrom Bramwell told me that he had once observed a man suffering from alcoholic pheumonia making curious movements with his hands; he discovered that the patient was a gardener, and on carefully analysing his movements it seemed he fancied he was rolling the bast used in binding plants. It may be remembered too that it is often difficult to keep a patient suffering from delirium tremens in bed because he is so anxious to get to his work; in his anxiety to do so, he will sometimes get out of the window under the idea that it will be the shortest way of getting there.

The prognosis is good, except in septic cases; with constantly repeated attacks, however, the risk increases; the nervous disturbance usually lasts about three days, but may continue for six or seven.

SEPSIS.

There can be little doubt but that in a large number of cases of delirium in surgical practice, septic infection will be found to be the exciting cause; I found that it was so in no less than 7 out of 10 consecutive cases which I was able to observe and thoroughly investigate; indeed, if we exclude the delirium of acute and chronic alcoholism, the delirium of septic infection is about 10 times as frequent as any other variety that comes under the notice of the surgeon. The question of the actual occurrence of this form of delirium has been fully investigated by Simpson; he found that during the 12 years 1884 to 1894, 5500 operations, not including operations for compound fractures and other examples of serious injury, were performed in Professor Annandale's wards; in 17 of these, actual sepsis, either before or after the operation or injury, undoubtedly had as a sequel mental derangement sufficient to necessitate removal to the special ward in most instances; I find that during the time these cases occurred 9,500 patients were treated in the wards. On continuing investigations at the point where Simpson left off, I find that subsequently and up to the present date 4 similar cases occurred among 2437 patients on whom 1424 operations were performed; this gives a slightly smaller percentage than Simpson's figures, the difference being probably due to the improved antiseptic and

and aseptic technique introduced during the 15 years under review.

It is interesting now to observe that though septic infection is such a comparatively frequent exciting cause of delirium, it seldom acts as such unless some well-marked predisposing cause be also present; of such predisposing causes chronic alcoholism is the most frequently present; another is the senile condition, the significance of which I have already referred to, while another important cause is Malignant disease, especially if it has spread so as to involve the skin. Among the 17 cases recorded by Simpson, 6 were suffering from malignant disease and 6 were the victims of chronic alcoholism; in the 7 cases I observed, I found malignant disease, the senile condition, and chronic alcoholism each acted as a predisposing cause in two cases: In only one case was I unable to find any predisposing cause.

The average age of these patients was 45°9 years; the average time at which delirium set in was the 4th day after operation, and its average duration was 6 to 8 days; occasionally delirium persists for a long time as in the case of chronic alcoholic delirium excited by sepsis which I shall presently record and in another case, where the patient was again of an alcoholic tendency, in which mild delirium persisted for several weeks after a radical

amputation of the penis and scrotum for malignant disease. Taking all the cases together, I find that 15 out of 24 were immediately fatal, while the average age of these fatal cases was 56·1 years, showing that the prognosis in septic cases is more serious as age advancesc; it is this last fact probably that accounts for the statements I have observed in all the text books on surgery I have consulted, to the effect that recovery is rare when delirium occurs in senile cases, a statement, however, which I have shown to be incorrect when we consider delirium due to all causes.

In discussing the kind of delirium seen, it will be well to remember that inflammatory fever has a very different aspect in persons of different constitutions, and that accordingly Erichsen, Walsham, and most writers on surgery have distinguished three types, the Sthenic, the Asthenic and the Irritative; in any of these types delirium may occur; in the Sthenic the character of the delirium corresponds to the gereral condition; the patient is noisy and excited, usually struggles to get up and is with difficulty restrained; an instance of this condition is afforded by the case I have reported under Gangrene, of a patient suffering from a strangulated hernia, who repeatedly threw off all the bedclothes and shouted loudly for a cab to come and take him home. In the asthenic, delirium is of a much less violent nature, usually consisting in little more than some low incoherent muttering, with occasional

ineffectual attempts to get up^; such a case of delirium I have also described under Gangrene; it was relieved by turning on the light, and might very well be considered as the delirium preceding death for such it really is in these asthenic cases. The irritative cases are those in which chronic alcoholism is the predisposing cause; in these, nervous symptoms predominate and delirium is frequently observed. Such a case was the following.

J.A. aet.55, Widow. Charwoman. Of intemperate habits. A fortnight before admission she sustained a burn of the third degree, involving the greater part of the right forearm; she refused to come into hospital, though advised to do so; she was very irregular in attending as an outpatient, and the wound became obviously septic; when she at last consented to come into hospital the arm was in a most unhealthy state so that the next night secondary haemorrhage occurred from the radial artery and one of the radial veins; early the following morning, the arm was amputated; that night the patient became noisy and excited - frequently did not know where she was, and had constant hallucinations, saying that she saw rats, and other venomous beasts; she also had incontinence of urine; she was removed to the special ward and died two days later . This was really to all intents and purposes an attack of delirium tremens, showing the hallucinations characteristic of that disease ; the case was rapidly fatal as the majority of these

septic alcoholic cases are.

A more interesting and satisfactory case was the following.

A.S. aet.65. A Railway Navvy, formerly a Shoemaker; had led an extremely dissipated life; at one time he had a good shoemaker's business, but lost it through excessive indulgence in alcohol; then he became a railway navvy; said to have got drunk every Saturday night and on all other occasions when he had money available; in spite of this life he had enjoyed good health; owing to his depraved habits, his wife and five of his six sons had left him and refused to have anything more to do with him. Two days before admission he was found late at night lying unconsious on the railway under a bridge which he was supposed to have fallen over. He had gone out to pay his funeral insurance; his breath smelt of alcohol; he was found to have a compound fracture of the lower end of the left femur; he was removed to the workhouse, where a projecting portion of bone was removed and the wound stitched up. Two days later he was moved to the Royal Infirmary; the injured limb was put up in splints in the usual way; unfortunately the wound become septic; six days after admission there was a good deal of suppuration and considerable constitutional disturbance, the temperature being 102 at night; he was very noisy when the wound was dressed, swearing in most disgusting terms at those who attended

to him; at other times , though not noisy, he was peculiar in manner and onversation; he called the nurses his "dear lambs", and was always complaining of thirst, though he had a sufficient quantity to drink; on one occsion he wanted to drink the basin of lotion used for dressing the wound. The inflammation spread rapidly up the leg, and at the same time his general condition gave cause for alarm; five days later the question of amputation was considered, but he was found to be too feeble for such an operation. At this time it was found that he interpreted all sensations, such as pain, taste etc, as a sensation of cold; he objected to the hypodermic needle because he said it felt so cold, and when given a hot drink he said he liked it because it was so cold. He was now treated and with marked benefit by repeated injections of antistreptococcus serum, so that six days later his general condition was considerably improved; amputation was then decided on, but two hours before the time of operation he had an attack of syncope, and became apparently moribund; he was revived by stimulants, but remained in a most critical condition for several days, and the operation was accordingly indefinitely postponed. He suffered much from hiccough , and the case was thought to be hopeless; gradually, however he got stronger and the leg healthier, and as he did so, became more difficult to manage :, he became very erotic towards the nurses, and as he was

noisy at night , he was removed to the special ward. This had a most beneficial effect, and he was never noisy again; he was, however, quite delirious not knowing where he was and being full of delusions; at this time he thought he was on board ship, of which he supposed the man in charge of the ward to be the captain; he though the captain was unable to stop the ship, and put him ashore; he regretted this, but made no violent complaints, indeed he was quite pleasant and easy to deal with in every way; at times he got a little impatient for his whisky which was given every four hours,, but was always induced not to make a fuss about it, by being told that the boy had gone off in a boat to get the whisky and had not yet returned. At this time he usually slept well, though with the help of an extra dose of whisky at night; if this failed $\frac{1}{100}$ gr. of hyoscine acted well. At an earlier period nothing could be found efficacious for the excitement or insomnia. Gradually his mind became clearer and after a month in the special ward he was moved back to the ordinary ward; it was now three months since he had first come to hospital, but there was still a little discharge from the wound; a month later he was quite right mentally, the wound had healed, and the union of the fracture had apparently taken place; the limb was however useless as the knee joint was quite disorganised, and there was considerable shortening. Under these circumstances the patient decided to have the leg amputated; this was done nearly five months after

he was first admitted to hospital; the wound healed by the first intention and he was up in less than a month, quite well both physically and mentally.
It is interesting to note how successful this last operation was, and it shows clearly that even the most confirmed alcoholic can be got into a state of health far from unfavourable for operation.
As regards the variety of delirium observed in these cases, Hunt states that in septic delirium there is usually a "loss of the sense of locality" , and a "wish to go home". I believe the delirium will frequently be found to be of this nature; it certainly was so in the three cases I have just referred to.
Little need be said as to the diagnosis or treatment of this kind of delirium; the diagnosis is obvious on examining the wound; the treatment is the combatting of the septic process by freely opening up the wound and frequently washing away all discharge Frequent dressing and copious irigation should be the rule. Stimulants must be given according to the state of the pulse and other general signs; they will not increase the delirium; Sedatives may be tried to control the delirium but they will be of little use till the septic process is stopped. for this purpose the use of antistreptococcus serum seems to be useful.
The prognosis is bad, but occasionally the most apparently hopeless cases recovered, the last one I have recorded being a remarkable instance of this.

ERYSIPELAS.

Although at the time of writing this thesis, Erysipelas is believed by many to be merely one form of manifestation of septicaemia, the same bacteria being found in both diseases, still there is such a well marked clinical difference between Erysipelas and ordinary septic infection, and they have for so long been regarded as distinct diseases, that I think it will be well to briefly consider erysipelas as an independent condition.

Delirium is a frequent complication of erysipelas, being observed much more often than in cases of ordinary septic infection; the older writers, such as Moore, considered it usually due to the hyperpyrexia, but as the rise of temperature is largely an index of the virulence of the infection, we are entitled to agree with the more recent views of Bourges that it is essentially toxic in origin; its occurrence does not in the majority of cases indicate that meningitis has been established; extension of the inflammation to the membranes of the brain is rare, except when the primary site of infection is on the face or scalp; in such a case there is a special risk that the membranes will be involved and under such conditions delirium is often a sign that septic meningitis has developed, whilst death must be the ultimate issue. Both the senile and alcoholic diathesis, but more expecially the

latter , are exceedingly effective predisposing causes.

The delirium according to Watson Chsyne and other writers tends to be of a violent nature, at any rate in the earlier stages; it is frequently ushered in by head-ache and restlessness; in the later stages, as the strength becomes exhausted a low muttering delirium may be observed, passing on to a condition of stupor.

The essential point in treatment is to check the septic process by local applications and by the injection of anti-toxin, if deemed advisable:, at the same time the delirium must be treated as a symptom by itself; for this nothing is so efficacious, especially if the temperature be high, as cold sponging or even cold bathing, if the patient's condition admits of it. This may be done three or four times a day; an ice bag to the head often answers the purpose:, should this fail bromide and chloral may be tried, or better still opium or morphia in full doses; the latter is so valuable in these cases that it is well to give it directly there is the least indication of a tendency to mental disturbance.

ANTHRAX.

Anthrax is a rare disease in man; there are several varieties of the disease, but all are characterised by acute inflammation and consequently delirium is not infrequently noticed among their manifestations. It will be remembered that Greenfield has divided the disease into two primary forms (1) External, (ii) Internal. In the external form or Malignant Pustule proper, delirium sometimes occurs shortly after the development of the pustule; whether it will occur or not, depends chiefly on the amount of constitutional disturbance and this is very variable; there does not appear to be anything characteristic of the delirium, which is similar to what may be seen in ordinary septic poisoning; it may assume a melancholic type or a maniacal form. In the Internal form mental depression, sometimes with insomnia, is often noticed among the earlier symptoms, at a later stage there may be more marked delirium, usually of a violent nature, especially if the cerebral centres are involved; death however, usually occurs before this stage. It is interesting to note that one case of recovery has been recorded after violent delirium set in; this occurred in a case recorded by Peard, in which the patient was described as being unconscious and raving.

GLANDERS.

Glanders or Farcy is an extremely rare disease in the human subject ~~subject~~, but as it does occur and delirium frequently appears during its progress, it is necessary to refer to it. There are two varieties of the disease, (1) acute (ii) chronic. In the acute form there may be a little mental excitement in the earlier days of the period of invasion, which begins from 2 days to a week after innoculation; as the constitutional disturbance becomes marked and the temperature rises to 103 or 104 there may be more marked delirium; during the last stage of the disease delirium nearly always occurs.

In the chronic form there is seldom any mental disturbance, until the disease takes on an acute form which it frequently does sooner or later.

I have already stated that delirium frequently appears during the progress of this disease; I find that during the years 1855 to 1872, six cases of glanders were fully reported in the Medical Times and Gazette; in five of these six cases delirium occurred; in three of them delirium only occurred during the last 48 hours, and was of that low muttering variety which so frequently occurs before death. In one case the patient was described as peculiar and excited in the initial stage a fortnight before he died. In the fifth case delirium occurred five days before death and continued till a few

hours

before the end; the patient was violent and frequently attempted to get up, the delirium being apparently similar to that seen in sthenic Inflammatory Fever to which I have already referred. The accounts of the nature of the delirium are somewhat meagre, though otherwise the cases are fully reported; there seems, however, to be nothing special in its character; it is quite similar to that seen in Septicaemia or Sapraemia; usually as I have said it is of the nature of the delirium preceding death; such delirium occurred in another case reported more recently by McCormack.

A diagnosis of the disease is practically always made before the stage is reached when delirium occurs; it should be remembered that the disease resembles rheumatism, before the eruption appears, and the eruption has been mistaken for smallpox. The diagnosis depends largely on the history, while in all doubtful cases finding the specific micro-organisms in the nodules or the discharge will at once settle the question.

There is no specific treatment for the delirium, nor indeed for the disease. Opium or other sedatives may be used to calm the nervous system, while stimulants are generally, if not always, required for the general condition.

In any case the prognosis in Glanders is bad, only 1 in 15 of the acute cases recovering, and about half of the chronic. Should delirium occur, I imagine the prognosis to be hopeless. All the seven

cases I have referred to died except the one in which there was no delirium.

HYDROPHOBIA.

There is no surgical disease in which delirium occurs so frequently as hydrophobia, a malady indeed which manifests itself chiefly through disturbance of the nervous system; Forbes states that Doctors Shinkwin and Holland found delirium occurred 80 times in 120 cases: Mental disturbance may occur at any time during the progress of the disease; thus in the first of the three stages into which the symptoms are usually divided, namely the stage of development during which the most marked symptom is the stiffness round the neck and throat, there is usally some mental excitement; the patient is generally troubled and anxious about the wound, and often becomes irritable and ill-tempered; during sleep he often starts up in a frightful dream and then sinks back into a state of great mental depression and gloom. In the second stage, the stage of hyperaesthesia, there are nearly always convulsions, the mind is in a condition of fear and anxiety, culminating sometimes in a state of unutterable despair, or sometimes of furious anger; there is usually almost complete insomnia, and the patient is often unnaturally talkative. There may be insane impulses and delusions, with sometimes, it is said, an inclination to bite. As the disease advances, both the frequency and the intensity of the paroxyms is augmented, and the mental state borders on mania. In the third stage, or stage of exhaustion

there is marked depression.

A fairly typical case which was treated at St. Mary's Hospital, London, has been recorded by Owen. Five weeks after the bite, the patient, a man, became restless and depressed in spirits, with great fear of being seized with hydrophobia. A fortnight later he was admitted to hospital, his condition in the meantime having become gradually worse. At first there was no delirium, further than the depression already described, but the second night he suddenly became excited, saying he must go home at once, as attempts were being made to poison him with whisky.. A couple of hours later he got worse, and sprang out of bed; he was with difficulty got back to bed and held there; the delirium continued to be of a violent nature and he nearly overpowered his male attendant; he made great efforts to expectorate; the delirium continued all night until 11 a.m. the following day, when he suddenly collapsed and became quiet:, he died a few hours later.

Although delirium in hydrophobia is usually of a melancholic type, while delusions, if present, are delusions of suspicion, other varieties are occasionally seen, as in an interesting case, recorded by Cockle, in which the patient exhibited a form of religious mania two days before he died; he thought he had secured a place in heaven and had only 20 minutes longer to live.

It is scarecely possible that there could be any doubt as to the cause of the delirium in a case of hydrophobia; it has been sugested that this disease might be confounded with tetanus, but delirium is exceedingly rare in tetanus, and the diferences between the two diseases are well marked. In tetanus the incubation period is short, seldom as long as a week, in hydrophobia it is never less than 12 days, the average being 61 days; in tetanus some of the muscles are often in a state of rigidity and the convulsions occur at much shorter intervals than incases of rabies. In tetanus, the secretion of saliva is rarely increased, and the muscles of the lower jaw are frequently in a state of tension. It is important too to make a diagnosis from the effects of the mental agitation and fear simulating hydrophobia (hydrophobia imaginaria), seen sometimes in those of a neurotic tendency who have been bitten by a dog or other animal liable to rabies. Three such cases have been recorded by Flemming in his work on Rabies; in them the only sign of the disease was the patient's professed horror of water; two were cured by being induced to drink water, and the third was after some days satisfied that he could not possibly have rabies, as his general condition had never got any worse since he first thought he had the disease; these cases might really be classified under the heading of "delirium of fear", to be cured by mental theurapeutics, An absolute proof of the possibility of infection is afforded by inoculation experiments

with preparations from the spinal cord of the animal that inflicted the injury.

Treatment unfortunately can only be palliative once delirium and with it other well marked symptom have developed; the excellent results obtained by preventive inoculation at the Pasteur Institute do not hold good once the disease has really declared itself, no cure having been recorded in such a case.

In the palliative treatment, the chief indication is to soothe the nervous system; the patient should be kept at rest in a dark quiet room, morphia being given in sufficient quantities to allay pain, chloroform may be administered to relieve spasm, and thirst should be alleviated by enemata. The inhalation of nitrite of Amyl is said by Forbes to give great relief.

The prognosis is hopeless once delirium or indeed any sign of the disease has appeared.

Delirium is an extremely rare symptom in tenanus, indeed it is doubtful if it ever occurs; Hunt denies its occurrence and Keen & White state that in Tetanus consciousness is retained, and the mind is quite clear to the last; Forbes, however, suggests the possibility of its occurrence, and considering the agonizing nature of the pain experienced in the progress of the disease, and the variable effects of any disease in the different diatheses, and at the different stages of life, I should be surprised if delirium had never occurred: I have looked through the records of a large number of cases, but in none of them is delirium mentioned except in one recorded by Benton,, who states that during the 12 hours preceding death, there was "occasional muttering delirium" : such delirium is the delirium preceding death, and cannot in any way be regarded as characteristic of the disease.

IODOFORM POISONING.

Few of the causes of surgical delirium have attracted more attention of recent years than poisoning by iodoform: "this drug, like all other powerful antiseptics is locally irritating and generally poisonous " (Erichsen) and "it is certain that it is one of the most frequently toxic of the antiseptic agents in ordinary use" (Roswell Park); when it is so, it not uncommonly causes delirium and that often of a serious kind; as the delirium is only one of many morbid symptoms, it will be well in discussing it to consider briefly the whole question of idoform poisoning.

Iodoform came into general use as an antiseptic about the year 1878; it was thought to be innocuous, and as it was found by clinical experience to be a valuable antiseptic and disinfectant, it was extensively and freely used, especially in Germany; while chiefly used as an application to wounds, it was also administered internally in certain cases. It was soon noticed that whether applied locally or given by the mouth curious symptoms, often severe, and sometimes ending in death occasionally followed its use. Several such unfortunate cases have been carefully reported, with the result that iodoform poisoning is now a well recognised condition more or less fully discussed in all the recent treatises on surgery. A large number of different symptoms have

been observed; I shall first merely mention all these, and then discuss some of them a little more in detail. The following symptoms then have been noticed, wakefulness, drowsiness, complete insomnia, deep sleep, restlessness, irritability, loss of memory, head-ache, giddiness, dilated pupils, double vision, amblyopia, photophobia, taste of iodoform, smell of iodoform, loss of appetite, coryza, muscular weakness, paralysis, progressive emaciation, rapid and feeble pulse, (its rate may be 140 or even 180), fever , vomiting, diarrhoea, albuminuria, sense of impending death, spasm of the muscles of the face, neck or limbs, mental derangement of various kinds, erythema,: also erythema and eczema at the seat of application. The number and variety of these symptoms are striking: "they vary much in severity and it is rare for more than two or three of them to be present at once", (Hale White); of no other disease then can it be more truly said that no two cases were ever exactly alike, so that it is little wonder that some of the earlier cases were only diagnosed after death; some were perhaps never diagnosed at all. I have endeavoured to find if there are any specially diagnostic symptoms, but after studying a considerable number of papers and reports of cases am obliged to conclude there are none, though from time to time different writers have asserted that some special condition is always present.

One of the most important symptoms is the rise of temperature; this is a pretty constant symptom, occurring in nearly all the cases of which I can find a complete record; Bowlby has, however, recorded a case, in which there being pyrexia before treatment, no change in the temperature occurred when iodoform was being used, and iodoform poisoning established; Hayes states that often in the young there is no rise of temperature pyrexia may be the only symptom (Roswell Park); it may be marked as in a cases recorded by Fox of a boy suffering from an ulcer; after application of iodoform, the temperature rose from normal to 105°; in this case there was also erythema and albuminuria; on stopping the iodoform the boy at once recovered. Another important symptom is albuminuria; attention was directed to this largely in conseqnence of Dr. A.V. Koriander of St. Petersburgh's experiments on dogs; he injected lethal doses into the peritoneum, and at the post-mortem examination always found nephritis affecting the renal glomeruli. Zeissel, as reported by Fox, thought that iodoform might be used and given with confidence if the urine was regularly examined for albumen; Hayes, however, states that not infrequently there is no albumen in the urine and Stanley Boyd has recorded two serious cases, one of them fatal, in neither of which albumen was found in the urine; in the fatal case the kidneys were found post-mortem to be healthy as were all

the internal organs. I have also seen a case - a mild one, to be presently described - in which iodine was found in the urine, but no albumen. I believe that if the urine is examined, it will usually be found to contain iodides or free iodine or both, but this is a sign of no diagnostic value, because as Fox has shown there may be excretion of iodine in the urine during or after the use of iodoform without any constitutional disturbance. The other physical signs are even less diagnostic; some of them are very rare; without therefore making further comment on them, I shall now take up the consideration of the mental symptoms.

In the milder cases there is often no mental change; in the more severe delirium frequently occurs; it may take the form either of mania or melancholia and varies much in its intensity; thus Bowlby reports a case of abscess of the breast, in which the patient though otherwise very ill was only affected mentally so far as to be described as "light-headed", and in a case of tubercular peritonitis, reported by Keetley, which attracted much attention and discussion the patient was said to be "irritable" and suffering from "an indefinite kind of delirium . She used to sing songs all day, and a great part of the night." Both these cases recovered. Bowlby states that he has "seen several others with occasional wandering and incoherent talk but no danger to life". As an example of a more marked form of delirium may be mentioned a case reported by Bowlby

in which after excision of the Breast there was violent delirium with great excitement and insomnia; the only physical sign observed was a high temperature; in spite of the use of idoform being discontinued, this patient died three weeks later without ever being conscious again. Konig, as reported by Hayes had several cases in which the patient became "terror-stricken" or "suicidal". There is no doubt that the occurrence of delirium is an important danger signal, which should never be disregarded. "if directly it occurs, the iodoform be removed, fatal terminations would be very rare" (Bowlby); on the other hand, if its use be continued, the mental symptoms will become more and more grave, and will not end till the lunatic asylum or death is reached; König who had experience of 32 cases states that the patient seldom recovers, if there is either furious delirium or marked melancholia.

From what has been said in discussing the symptoms, it will be evident that a definite diagnosis is difficult and at times impossible: all that can be done is to watch every case in which iodoform is being used carefully and to at once suspend it if any unfavourable symptoms develop: whenever the progress of a surgical case is not satisfactory, one of the first questions that should be asked is, "is this patient being dressed with iodoform?" No abnormal symptom, however slight should be disregarded, and it must

be remembered that though poisoning usually occurs only when large quantities are employed, "the reverse has occasionally been observed" (Roswell Park); I may mention, however, that there is no fatal case recorded in which only a small amount of iodoform was used. In the young the symptoms are frequently not unlike those of tubercular meningitis; a differential diagnosis, however, can usually be made by the absence of previous head-ache or vomiting, by the sudden rise of temperature, by the presence of free iodine or iodides in the urine, or by the recognition of the fact that iodoform has been applied.

The principle indication in treatment is to at once discontinue the iodoform; at the same time diuretics may be given to hasten the elimination of the iodoform which has been absorbed and which is chiefly excreted through the kidneys, but in mild cases at least, they are not necessary; in the severe cases stimulants will often be required. It should be remembered that the symptoms often persist for some time after the discontinuance of the ~~idoe~~ iodoform, but they gradually pass off if the case has been recognised in time. As illustrating how the diagnosis may be made and the amenability to timely treatment the following case is interesting;

J.M. aet.59. Carpenter. Family history and personal history good; habits temperate; a healthy man: admitted to hospital suffering from Necrosis of the

left tibia: under chloroform sequestrotomy was performed, a cavity in the bone the size of a hen's egg being left as a the result of the operation: this cavity was stuffed with carbolized gauze freely besprinkled with iodoform: a similar dressing was laid over the wound: the dressing was changed on the second day, and subsequently every other day, iodoform gauze being always used: all went well till the 15th day when the patient was noticed to be "not quite so well"; at night the temperature which had previously been normal was 102°, without obvious cause; the next day in the morning, the patient was very unwell: he had no appetite and complained of a bad taste: when asked if the taste reminded him of anything, he said that it suggested the yellow powder used in the dressings: on examination, Iodine was found in the urine, but no albumen: all iodoform was at once removed and in future boracic only was used: the same night the temperature was normal and the patient was otherwise better: he made an uninterrupted recovery. In treating this case not only was iodoform discontinued, but also carbolic in accordance with Von Mostig-Moorhof's recommendation, as described by Keetly; he has shown that in Iodoform poisoning carbolic should never be used, because if absorbed and it generally is absorbed to some extent at least, it checks elimination by the kidneys. This consideration is not unimportant: Keetly sugests that corrosive sublimate and boracic acid may possibly act in the same way, because in the

case reported by him, the symptoms did not subside when the use of iodoform was stopped, but only after all antiseptics were discontinued, and nothing but sterilized water employed.

The prognosis is good, if the cases are recognised in time: even when a diagnosis is not made till grave symptoms have developed, there is usually recovery on discontinuance of the iodoform, and some remarkable instances of this have been reported: in one of Bowlby's cases, the patient, a boy of 11, whose knee was excised became "comotose", and "seemed actually moribund": yet he revived quickly when the iodoform was removed. Fatal cases are more likely to occur in the old and anaemic (Roswell Park). König, who had the opportunity of observing a large number of fatal cases says that most of them were over 50 years of age. As has already been mentioned, marked dilirium forms an unfavourable element in the prognosis.

It would be beyond the province of this paper to discuss the vexed question of the value of iodoform as an antiseptic: whatever opinion may be formed on that subject, I may say in conclusion that the risks of iodoform poisoning are not such as to entirely contra-indicate its use: it may be used, but it must be used with caution, a careful look-out being kept for unfavourable signs: It may be mentioned that the crystals of iodoform are safer than the powder owing to their being absorbed less readily.

ACUTE ALCOHOLISM.

Of the various forms of delirium complicating surgical cases, that due to acute alcoholism is of the most frequent occurrence: one of the noticeable features of this delirium is the blunting or even total annihilation of sensations of pain, in consequence of which a patient who is drunk and apparently suffering only from slight injury may be found later on to be more seriously hurt: great care is therefore necessary in dealing with such cases: for the same reason too special precautions must sometimes be taken to prevent the patient converting by his restlessness a simple injury into a more serious one.

Treatment consists in applying such restraint as may be necessary, the restraint being applied in the manner described in the Introduction: at the same time the stomach may be washed out with advantage, the patient being examined first to make sure he is not too feeble to stand the shock sometimes attendant on this procedure; subsequently a large dose of Henry's solution or other saline purgative may be passed into the stomach.

CHLOROFORM.

There is no doubt that chloroform is a poison to the nerve centres: indeed it is to this property that it owes its beneficient action as an anaethetic: its effects on the nerve centres are primarily to stimulate them, and secondly to ~~stimulate~~ paralyse them, these effects being produced first in the highest centres, which it will be remembered are the latest developed and consequently most unstable, and later in the lower centres. After the highest centres are paralysed there is a stage of delirium, which according to Wigglesworth, is not distinguishable from a transitory attack of acute mania. the length of this stage and more especially the violence of the mania vary much in different individuals, in accordance doubtless with the degree of stability of their higher nerve centres. In some cases no delirium is observed, the patient passing into a state of complete chloroform narcosis, as quietly as into a natural sleep. When the patient is allowed to come out of the influence of the anaesthetic there is again a stage of excitement, the highest centres being the last to resume their normal functions. Delirium of a temporary nature then is frequently seen during and immediately after the administration of chloroform; the first stage of excitement is seldom of more than a few minutes' duration as the continued administration of the anaesthetic produces

complete narcosis; the subsequent excitement may be and is sometimes, though rarely, prolonged, - so much so indeed in certain instances as to actually develop into insanity: such a case has been recorded by Savage. A patient was operated on for cancer of the rectum: directly he became conscious it was evident that his mind was affected, and he was removed to Bethlem asylum: on arrival there he was very weak: he was restless, incoherent, repeating meaningless expressions, and his memory was defective; he improved a little but remained weak in mind; after a few weeks he was sent home, his condition being considered one of harmless dementia; he remained in this condition for some weeks after going home, and then suddenly recovered. No doubt Savage thoroughly satisfied himself that this was a case of post-operative insanity, due to chloroform, but the absence of any account of the condition prior to operation, and of the technique of the operation and after-treatment must make others sceptical; I have already shown that malignant disease is a predisposing and eventually an exciting cause of delirium, while the shock of an operation is also an exciting cause; these might quite well have caused an initial delirium which was prolonged by the subsequent use of iodoform; I do not know whether iodoform was used or not, but the case, especially in the suddenness of recovery, is very similar to some I have referred to under iodoform poisoning. In spite of this possible explanation

in this case, it is quite certain that in certain rare instances insanity does develop after the administration of chloroform; Wiglesworth has recorded such cases and Alamartine has collected four cases of hysteria occurring after a single administration of chloroform. Chloroform undoubtedly causes temporary delirium, and as Savage has pointed out anything which does so, may also cause insanity, the insanity being the result of the temporary disturbance of function, by whatever cause induced.; no such result, however, is attained unless there is a well marked predisposing cause in the form of a tendency to insanity and the allied neuroses: such a tendency, it has been well observed by Savage, may be both hereditary and acquired: thus the victim of chronic alcoholism has an acquired tendency to insanity: the effect of chloroform on such patients is, as is well known, to intensify the delirium prior and subsequent to complete narcosis, but the delirium is not markedly prolonged as a rule. There is a condition occasionally seen in which after the mental effects of the anaesthetic have apparently passed off, delirium of a few hours' duration xxxxxxx xxxxxxxx supervenes. This occurred in the case of a young man, aged 21, a pupil teacher, with a phthsical family history: no history of insanity: one morning under chloroform an excision of the kneee was performed for tubercular disease: he was put back to bed after the operation at 12.30 p.m. at

1 p.m. he suddenly sat up in bed, shouted and offered to fight those in attendance ; he called for water but refused to drink it when brought; $\frac{1}{6}$ gr. of morphia was given hydodermically, but this only intensified the mental excitement. He continued in a state of great excitement for about 2 hours, then another 1/6th gr. of morphia was injected hypodermically and he gradually became quiet, and half-an hour later went to sleep; Vene says such cases are seen from time to time, I am not aware of any other reference to the condition, those who have been on the look-out for similar cases being anxious to collect rather cases going on to actual insanity; many such were referred to in the Psychological section at the meeting of the British Medical Association, when it was suggested by some that the fact of their occurrence possibly made the use of chloroform unjustifiable, at any rate ~~with~~ in those with a marked tendency either hereditary or acquired to insanity: this view was not, however, generally adopted, and indeed it was shown, that probably chloroform acts quite as often as a prophylactic to the occurrence of insanity. In the earlier days of the use of chloroform many such instances were brought forward among the other objections of those who opposed the use of chloroform: now, however the case of those who would assert that chloroform is at all frequently productive of insanity is at once disproved by the fact that puerpural in-

sanity is not increasing in proportion to the number

of births, while the proportion of women to whom chloroform is administered during labour increases largely every year.

Besides chloroform all other general anaesthetics are liable in certain rare instances to cause a prolonged disturbance of the mental functions; thus cases have occurred after the administration of nitrous oxide ; Gasquet has recorded one case in which there was rapid recovery, while Savage has described the case of a woman who developed hysteria from excessive and prolonged indulgence in alcohol: one morning when in her usual health, she went to the dentist to have some teeth extracted; she was put under the influence of nitrous oxide, and never became sensible again. The doctor who was called in that evening found her delirious, conjunctivae insensible, passing urine and faeces, making constant irregular movements and talking; this condition of delirious mania lasted three weeks , when it developed into dementia. A few cases of mental disturbance due to one administration of cocaine have been recorded. Vene has collected two cases of acute mania lasting three hours after the use of cocaine.

URAEMIA.

Surgeons have for long recognised that the existence of disease of the kidney is the strongest contra-indication to any surgical treatment of the nature of an operation: unfortunately, however, the surgeon may be obliged to adopt such treatment in certain cases: he may be called upon to perform an operation urgently required for the preservation of life on a patient who is already the subject of renal disease: this disease may be primary, or may be secondary to some surgical lesion, such as disease of the bladder, enlargement of the prostate, or stricture of the urethra. Further in certain rare instances, it is found after operation that the kidneys are affected in a patient in whom they were previously, as far as could be ascertained, perfectly healthy: this is believed by Wilson to be due to the action of chloroform, for he has found that after its use, tube-casts and albumen can occasionally be detected although previously the urine was quite healthy. Hence Uraemia, or the group of symptoms which may arise in most renal diseases because of the failure on the part of the kidneys to perform their eliminative function, is a condition which cannot be entirely excluded from surgical practice. Simpson found that uraemic symptoms occurred 7 times after 5500 operations: of the 7 cases 6 were suffering from diseases of the urinary organs

and the other was an old man with a gangrenous finger which had to be amputated. I have twice observed uraemic symptoms to develop after perineal section for retention due to a long neglected stricture of the urethra. Now coma, rather than any active mental disturbance is the universally recognised ~~xxxxxx~~ characteristic of uraemia: Davis has, however, pointed out that among the prodromal symptoms of uraemia delirium is sometimes observed: the same observation was previously made by Raymond, who collected several cases of delirium which occurred prior to or concurrently with uraemia: I am inclined to think that if all cases of uraemia were carefully observed, delirium would be found to occur fairly frequently, but it is so slight and of such short duration that it is often overlooked: such a mild transient delirium occurred in both the cases I observed, the onset of coma being heralded by an exceedingly short stage of mental excitement.

The character of this delirium has been fully investigated by Raymond who collected records of 10 cases in addition to 4 cases which he himself observed of delirium occurring in chronic nephritis, the onset of the mental symptoms being coincident with or shortly followed by almost if not complete suppresion of ~~the~~ urine. In one case first recorded by Laségné , the patient, a man, developed acute mania lasting three days: he had a delusion that he had quarrelled with his children, and struggled hard

to get up and go and be reconciled with them, this man ultimately recovered. One of Hagen's cases became very religious, then melancholic; he ultimately died. In Jolly's case, a girl of 14, there was first excitement with refusal of food, so that the oesophageal tube had to be used: later on there was depression with hallucinations. One of Wilks' cases had acute mania with epileptiform seizures: later on she became lethargic, but recovered. Schultz' case, a very typical one, exhibited first acute mania with hallucinations of sight and hearing: then he became melancholic, and later developed a delirium of persecution, the mental disturbance extending over 26 days: this man died. Husland's case , a boy of 14, started with delirium and convulsions, and then suffered from mania with hallucinations for 4 months: he was then quite well except that his memory was a little feeble for 6 months, after which he suddenly collapsed in a new attack without either delirium or convulsions. Lécorché's patient , a woman, thought that attempts were being made to kill her; fear of poison stopped her taking food. In the first of Raymond's cases there was delirious excitement for 24 days: the patient was constantly talking to imaginary people: the last 6 days she was alternately excited and somnolent: she ultimately became comotose and died. Another case, a man, had constant hallucinations: through the window he said he could

see a calvalry regiment manoeuvering on the roof of the opposite house; he described the position of the officers and the movements of the troops in a most graphic manner; when told that it was an hallucination he realized his error, but when left alone his hallucination returned, at another time he saw niggers dancing and fighting, and also saw some children conducting a torch-light procession during which he could hear them singing. All the time he could answer questions rationally and concentrate his attention for a short time. Later on he couldnot do this, and towards the end thought he was in a carriage: he was continually shouting to the coachman to drive faster. Another man, a painter, also had hallucinations: they were of a very sombre nature, as he was always seeing corpses ghosts or cemeteries.

On analysing the cases, Raymond arrives at the conclusion that the characteristic mental disturbance is mania, alternating with melancholia, with hallucinations of sight and hearing.

The duration of the mental disturbance is very varied from a few hours to several weeks; it seldom lasts more than 6 days, but in one case, lasted 24 days, in another 26 and in another 4 months.

The prognosis is rather bad; 4 out of the 7 cases recorded by Simpson died. 9 out of the 14 recorded by Raymond died, and both I have seen died; but the prognosis must be based on the amount and character of the urine rather than on the delirium: what the

delirium indicates is that complete suppresion of ~~the~~ urine is on the point of occuring: should it occur and persist, of course the case is hopeless. Directly dilirium occurs in these cases, active treatment should be adopted: jalap should be given in ½ drachm or even drachm doses: diuretics may be administered, but potassium salts must be carefully avoided as it is now known that among the toxic substances which should be eliminated by the urine potassium salts occupy an important place: a hot air bath is often useful and Roswell Park states that much good is often done by giving cold water enemeta; the effect of which is to throw the reserve of blood in the portal vessels into the general circulation, thus increasing arterial pressure and so promoting kidney function. Venesection should be at once resorted to in urgent cases. Parke recommends the hypodermic injection of urea, as being the most powerful diuretic known and not poisonous in the manner formerly supposed. As illustrating how unexpectedly uraemia and its too frequent sequel death may occur in a surgical case, I may mention the case of a man 60 years of age, who suffered from a traumatic stricture of the urethra; he was apparently healthy in every way: after simple dilutation of the stricture he became slightly delirious and died with uraemic symptoms three days later. It is the knowledge of the possible occurrence of such symptoms that makes the surgeon so anxious in

genito-urinary cases: no doubt most of these patients owe the fatal issue to their own neglect in not putting themselves under treatment in a sufficiently early state. The dramatic words, however, written by Southey 20 years ago, are still true, "There is death approached by the bladder road, under the ablest surgical charioteering: enlarged prostate, thickened bladder, retained urine, catheterism, cystitis, catarrhal nephritis, uraemic symptoms".

INTESTINAL TOXAEMIA.

It has for long been known that the correct performance of intestinal elimination is most important for the general health; if this is not efficiently done all the systems of the body are injuriously affected, and among others the nervous system. Bridger has recorded a case in which delusions were caused by faecal accumulation.; a lady, aged 50, in eight months gradually developed delusions of taste and smell especially at night: she thought her husband and children by burning sulphur and phosphorus introduced poisonous fumes into her room to kill her; she left home for days to get rid of the persecution. She always had the bad smells and after a time refused food and accused the grocer, baker, butcher, etc. of attempts to poison her. She communicated with the police about these people. When physically examined a large elevated ridge was found stretching across the abdomen in the line of the transverse colon: this was due to a foetal mass which it took several days to dislodge: she soon recovered after this: in 6 weeks she was quite well ~~mentien~~ mentally and bodily. At the present time auto-infection following imperfect intestinal elimination is recognised by alienists as a possible and not uncommon cause of insanity: a man who was admitted to hospital suffering from a suicidal bullet wound in the chest, was considered on removal

to the asylum to be insane from this cause; before admission to hospital he had suffered from insomnia, loss of appetite, and gradually increasing depression: on admission he was depressed in manner appearance and conversation; he told me that he was annoyed by voices constantly telling him to kill himself, or that they would do the business for him; he acounted for not seeing the people who spoke by saying they were ventriloquists: his life was made so miserable by the voices that he bought a pistol and shot himself. The bullet entered the praecordial region, but did not injure the heart; as subsequently ascertained by means of the Rontgen Rays the bullet seemed to be in the left lung, but its locality could not be determined sufficiently exactly to indicate an operation for extration, especially as it caused no unfavourable symptom. The external wound healed rapidly, and as the patient at the end of 8 days was still insane, though sleeping and feeding better, he was removed to the asylum. The case was there diagnosed as one of auto-infection; he was treated for this and in a month was able to leave quite well. Two months later he returned to the asylum voluntarily as he had again become much depressed. He recovered in 5 weeks: on leaving then he was advised by the Asylum authorities to return whenever he felt depressed, as they considered his intestinal functions sluggish and that from want of attention to this, he would probably continue to

suffer from melancholic attacks from time to time. Park has pointed out that intestinal toxaemia is a frequent predisposing cause of sapraemia and septicaemia, and therefore in this way it may indirectly produce delirium. An illustration of the great importance of thoroughly evacuating the bowels before an operation as a prophylactic to the prevention of delirium, if not of worse catastrophe, is I think afforded by the fact that while I find delirium occurred only 24 times after 1424 operations of all kinds, that is after 1·6 per cent of operations, yet delirium occurred three times after 79 operations for hernia, or after 3·7 per cent: not only so, but all the cases of hernia after which delirium occurred were either strangulated or irreducible, thus rendering impossible purgation before the operation and also at least 4 days after it. Of the 79 hernias, 17 were strangulated and two irreducible: if we take these together we find delirium occurring after operation in 15·7 per cent of cases, an extremely high percentage.

In all cases of delirium, it is important to clear out the bowels well, and to keep them acting regularly; a good way of judging how far the delirium is due to auto-infection is by estimating the amount of indican in the urine. indican being always indicative of intestinal putrefaction: "Indicanuria should be estimated from a 24 hours' sample, of which a few c.c. are mixed with an equal amount of con-

centrated hydrochloric acid, two or three drops of a saturated solution of sodium hypochlorite or of common salt-petre being added, and, after mixing one or two c.c. of chloroform. The mixture is then shaken and set aside: indigo if present is set free and taken up by the chloroform which is coloured blue to greater or less extent. Before making this test albumen, if present, should be removed, and bile pigments should be separated by carefully adding a solution of plumbic subacetate ". (Roswell Park).
Free purgation is of course the treatment for this form of delirium. In obstinate cases Mc.Pherson recommends a course of intestinal disinfection: he washes out the stomach every day for a week: after an initial dose of calamel, 3 grns. he gives 3 grns. of naphtalin thrice daily.
The prognosis is these cases is good, but attacks are very likely to recur.

MALIGNANT DISEASE.

I am inclined to think that even before the existence of Malignant disease in a patient has produced that condition we know and recognise as "Cachexia", there is often circulating in the system some subtle poison which may itself be either the cause or the effect of the disease, and which is not to be detected by out present methods, but which has a deteriorating influence on the various systems, including the nervous system, unfitting them to functionate normally under any unusual strain. Whether this be so or not there is no doubt that the cachexia of Malignant disease must predispose to mental disturbance; Clouston says "the cachexiae .....may all be attended with danger to some brain functions"; Savage recognises cancer as a cause of insanity, and Richardson speaks of the delirium of malignant disease as a recognised condition. This is somewhat opposed to the teaching of Paget who stated, when lecturing on the Dangers of Operations that "malignant are not worse than others of the same age and condition; even if cachectic they often heal well". I cannot but think, however, that what I have stated is correct as I find that delirium is proportionally more common in patients suffering from malignant disease. I believe too it has been noticed that in cases of sudden death occurring shortly after operation without apparent case, the patient in the

majority of instances is suffering from malignant disease. In considering the results of 609 consecutive major operations the subsequent progress of which I was able to watch continually, I find that two patients who were apparently doing well till within an hour of their last breath, having recovered from the primary shock of the operation, died suddenly within thirty-six hours of the operation; both these patients were suffering from malignant disease.

As regards the frequency of occurrence of delirium in malignant cases, I find that ~~seme~~ seven out of twenty-four cases of surgical delirium occurred in patients under treatment for malignant disease. I am of course well aware that in some at least of these cases there were present other well known causes of delirium. Thus I have classified and elsewhere described one of the cases - a case of epithelioma of the lip - as a case of senile delirium; another case - one of scirrhus of the breast - was undoubtedly septic, and two others were also cases of scirrhus of the breast, an affection which I have already stated is the most frequently productive of delirium after operation. Malignant disease too we must remember frequently affects the lower bowel and anything that does so is not uncommonly the cause of some degree of mental disturbance. Further malignant disease occurs chiefly in the later decades of life. In spite of all these consideration, however, I think I may classify malignant disease as a predisposing cause of

delirium; the following is a case of such delirium H. A. aet.36. Male, single, farmer. Apparently he had had some of the signs of malignant disease of the rectum for two years; he saw no doctor till two and a half months ago; the first doctor he consulted treated him for haemorrhoids, but as no improvement resulted from the treatment, he consulted another doctor, who suspecting a new growth, recommended him to come to the hospital. He had lost 3 stone in weight in the last year. His mother died of malignant disease. On admission he looked very ill; he was found to have carcinoma of the rectum, too extensive for removal; accordingly Inguinal Colotomy was performed; the colon was opened three days after the first stage of the operation; a little iodoform was applied when the intestine was drawn out; a larger but still moderate amount was used when the colon was opened, and was also applied during the next three days; its use was then discontinued. The operation was eminently successful in itself, but eight days after the first stage of the operation, the patient became restless at night; he pulled the dressings off and got up, apparently while asleep. For the next three nights his condition was much the same; bromidia did not alleviate the condition; the next night as he was restless and excited after two drachms of Bromidia, given at 9 p.m., he was given 15 grains of trional at midnight; he still re-

mained sleepless; at 5 a.m. I was called to see him as he had got up and the nurse had with difficulty got him back to bed again; he had pulled all the dressings off; he was excited and incoherent; he thought he was at Appleby Station, and complained that the nurse would not let him move on to catch the train to Brough, where, by-the-bye, was his home. He was at once removed to the special ward. When there his condition improved, in that he never actually got up at night again though he often prepared to do so; he, however, never slept more than a quarter of an hour at a time; everything was tried for the insomnia, whisky , hyoscine bromide and chloral, bromidia, sulphonal, trional, paraldehyde, and bromide and chloral were also given during the day; none of these did any good, although given in large doses. He of course gradually got weaker and his friends knowing that the operation which had answered its purpose well, was only palliative, decided to remove him home. This they did a month after the operation. He arrived home safely, but gradually sank there, and died five months later; during all that time he suffered constantly from insomnia for which his doctor could find no remedy. Such cases are not uncommon, and are very difficult to treat; I have seen two similar cases in which insomnia and restlessness were troublesome, though not so much so as in this case; in both of them alcohol at night occasionally acted

as a soporific but not constantly; morphia should of course be given if there is pain but large doses are often required to induce sleep and even they may fail; the other hypnotics seems to be of little if any use. I think there can be little doubt that these are cases of what Sawyer calls "toxic insomnia", and therefore the most rational treatment would be the injection of some anti-toxine; something of this kind has been tried, the serum of animals rendered immune to such conditions as erysipelas being used; "one or two good results are described but the matter is still sub judice". (Roswell Park) It is to be hoped that working on these lines something of value may be found. Various other bold methods of treatment have lately been tried in cases of inoperable cancer with a view to checking the disease and alleviating the distressing symptoms which accompany it, such as inoculating with erysipelas or with the toxic products of the streptococci ; most of these have, however, ended in disaster. The injection of aniline preparations is said sometimes to do good. Very recently an attempt to relieve cases of scirrhus of the breast too advanced for operation by performing ovariotomy and subsequently administering thyroid extract has been made; I have seen three such cases but they were not successful, and indeed it does not seem likely that the removal of organs so important in the general economy as the ovaries could better fit a patient to withstand the inroads of an insidious and

active disease.

The type of delirium is usually but nor always melancholic ; Richardson, whose views corroborate those expressed earlier by Maudsley, says that there is no delirium characteristic of malignant disease but that when delirium occurs in the progress of malignant disease its type is determined by the organ involved; if that organ be the lower bowel then there is great depression, which as I have stated elsewhere is not uncommon in any disease of that part. Although depression is marked in these cases, there is seldom any suicidal tendency; the patients appear weary of life, do not wish to get well, and will make no attempt to do so. Such patients seldom recover, however successful the operation may have been in itself. It is not uncommon in these cases for the sense of locality to be lost; it was so in the case I have described the patient thinking he was at a railway station waiting to catch a train; this is also noticed in septic cases and is due probably to the toxic absorption.

TUBERCULAR DISEASE.

Considering the well marked connection between the Phthisical and insane diathesis, a connection especially insisted upon by Clouston who finds 2·4 p.c. of all cases of Insanity to be cases of Phthisical insanity, and considering also the large proportion of tubercular cases among the patients ..... admitted to a surgical ward, we might expect to find cases of mental disturbance due to the strumous tendency not infrequent. So far however is this from being the case that I find only two cases that could possibly be called "tubercular delirium" occurred among twenty-four cases of delirium of all kinds including acute and chronic alcoholism that occurred among 2437 patients on whom 1424 operations were performed, and perhaps neither of these cases should be classified as "tubercular dilirium", for one was considered at the time to be really a hysterical case and the other was a case not of delirium, but of true phthisical insanity, which had to be removed to the asylum. Hunt goes so far as to say, but incorrectly as I think, that delirium never occurs among tubercular patients, and that if it does, it must be ascribed to some cause other than the tubercular diathesis. The reason of this apparent discrepancy is, however, not far to seek; most of the tubercular cases placed under the care of the surgeon being cases in which the joints are

affected, a condition chiefly observed in the first two decades of life, have not yet reached that age at which mental disturbances in the tubercular begin to exhibit themselves. Further, mental disturbance is usually not seen till the lungs are evidently diseased, and patients in such a state are either not admitted to a surgical hospital , or are nearly always speedily dismissed, should they by any chance have been admitted. In case, however a patient with advanced phthisis should be placed under the care of the surgeon, it is well to mention that in this state there are often quasi-delirious symptoms and hallucinations due to the general cerebral mal-nutrition and disturbed circulation, the hectic, febrile condition and the toxaemia. Further it is said that one-third of such patients are despondent, with almost suicidal symptoms, with worrying hallucinations and delusions, chiefly associated with the sensory organs of taste and smell, though occasionally with hearing and sight. A few such patients are morose with angry outbursts of mania. If actual insanity occurs it nearly always takes the form of a monomania (Clouston) the subject being some persecuting one.

I have mentioned that two cases of delirium occurred in tubercular cases in the surgical ward; curiously enough both cases had hysterical fits, but I have no reason for suggesting that this was other than a mere coincidence.

The first was D. M. aet. 37. Married. Mason. The mother and a brother died of phthisis and the father and another brother are both in an asylum. Ten years ago he fell from a scaffolding on his left hip which was stiff and painful for some days, but recovered. Ten weeks ago he began to suffer from signs of hip joint disease on the left side, and had to give up work; he gradually got worse and so came to hospital. For the first few nights he suffered great pain, but there was no recurrence of this; he was treated by rest and extension. Three weeks after admission to hospital he had a hysterical fit early one morning ; he was rigid with his head thrown back, moaning, he could move and said he had no pain; he stopped moaning when told to do so; but was very troublesome; he passed urine and faeces in bed, and was twice found masturbating. he often pretended to take fits but stopped on being spoken to; the limb was fixed in a plaster apparatus and he was got up with great benefit to his mental condition; a week later however he became very noisy and was always either praying or singing; he had to be removed to the special ward whence he was removed to the asylum where he died two months later. At the asylum it was considered to be a case of "phthsical insanity" - melancholia."

The other case was : -

A.M. aged 33, female. single. admitted to a medical ward for phthisis; as the lung condition was not serious and improving and she was found to have

a cyst in one breast arrangements were made to transfer her to a surgical ward; on the day settled for moving her, however, she had, what was considered to be a hysterical fit; she was afterwards very noisy and excited and had to be removed to the special ward. The next day she was quite quiet and the cyst was opened; there was never any further mental disturbance and the wound healing well she left hospital a fortnight later.

Collins has recorded a case of "nervous delirium" the day after operation of amputation of a tubercular knee in a man 23 years of age who had always been temperate; he ascribes the delirium to the patient's being "worn out by physical suffering and mental anxiety".

Treatment must be on general lines; the prognosis is very bad.

SYPHILIS.

It is but seldom that delirium can be traced to a syphilitic origin; I can find no record of its occurrence during the primary stage of the disease; in the secondary stage it has been observed, though very rarely; Clouston in writing on cerebral syphilis describes a short delirium that may occur; I can find no reference to such a condition in Jonathan Hutchinson's work on syphilis and Mr. Cathcart informs me that during the five years he had charge of the Lock wards at the Edinburgh Royal Infirmary he never saw a case. In the tertiary stage and also in the hereditary form of the disease it occurs sufficiently frequently to attract more attention; the condition has been fully discussed by Clouston who describes two forms (i) "an acute delirious mania from a rapidly forming syphiloma on the cortex anteriorly with a rapidly progressing softening passing upwards, the whole acute mental illness lasting about 3 weeks and the patient dying"; (2) "mental symptoms of all kinds from syphilis of the bones, membranes and packing tissues generally, which depend for their character on the locus in quo " Such cases, however, fall to be classified rather as insanity than as delirium, for we must remember that the lesion is but seldom amenable to treatment owing to the site it generally selects; Ross has suggested that there are certain seats of

election for the syphilitic poison to deposit itself; one is the cortical area corresponding to the distribution of the middle cerebral arteries, the other is at the inter-peduncular space at the base of the brain; at the same time there may be syphilitic arteritis and nuclear proliferation round the capillaries of the cortex which gradually become obliterated after the ~~initial~~ intermediate stages of degeneration.

The condition of syphilo-phobia has been drawn attention to by Blandford, who says it is not uncommon; patients who have or have had syphilis become melancholic and become possessed of the idea that they will die of it in its most loathsome form In the secondary stage delirium must be treated on general principles with the addition of mercury or iodide potassium as specifics, the disturbance is usually only slight and the prognosis good. When delirium develops in the tertiary stage, and the same may be said of the hereditary form, little can be hoped for as the result of treatment; the delirium may be treated on general principles with the addition of full doses of iodide of potassium; the prognosis, once the delirium has developed, is most unfavourable, if not hopeless.

SHOCK.

By the term "Shock" we understand the depression of the vital powers that is seen immediately or soon after an injury or mental emotion. Erichsen classifies shock under three chief forms, (i) shock with marked cardiac inhibition, (2) shock with general exhaustion of the nervous centres (3) shock with excitement or Erithetic shock. The two first forms are by far the most common; in them delirium seldom if ever occurs; the intellectual and perceptive faculties simply experience the profound depression present elsewhere; if death is to follow there may be a few slight mutterings as it approaches, but on speaking to the patient we find consciousness, though sluggish, is retained.
Some delirium is, however, not infrequent during the re-action, especially in children or those of a neurotic temperament. The rebound oversteps the mark and disturbance of the brain cortex is one of the consequences. Such delirium is very temporary and disappears directly the skin and other excretionary organs resume their functions.
In the third variety delirium is one of the most prominent features; Travers writing on constitutional irritations has called attention to this form of shock which he terms "prostration with excitement", and has pointed out that it might be mistaken for delirium tremens; this form of shock

is extremely rare; it is seen more frequently on the battle-field than elsewhere; in it every word and idea are usually quite coherent, but there is great exaltation of mind and an utter want of appreciation of the bodily injuries; sometimes, but not always, this is due to injury to the spine of such a nature that communication from the lesion to the brain is impossible; there is no collapse at first; the temperature is normal, the pulse full though rather frequent, the face flushed and the eyes bright; soon collapse comes on and a little later death ends the scene; Forbes states that he has never seen such a case recover. I have never seen such a case, except in those under the influence of alcohol, and can find no record of one; the picture drawn by Forbes, however, of an imaginary case is so vivid that I cannot forbear to quote his description. "The surgeon enters a ward some morning after a terrible accident has occurred and . . . . finds that a victim of this kind has just been . . . brought in and laid upon a bed. He is at once recognised by the patient as one in authority. "How are you, doctor", he says in a high voice; "what have they brought me here for? I'm not hurt! No, Sir! Look at that", and out goes an arm with the force of a prize fighter delivering a crusher. "Look here", and he tries to lift a leg, which his sensorium falsely tells him he has done, although his expression may indicate a vague and passing doubt.

" Why, there's my wife! Molly, What are you doing here? Don't cry; what are you crying for? I am not hurt; go home to the children, and tell them I'll be there to supper and at the Mills tomorrow; won't I, Doctor? Go home! " Soon this great tension gives way, collapse comes on, and by night the patient is in another home than that in which he promised to be". Occasionally in such cases there is furious mania; the limbs are thrown violently about , and the patient talks volubly and incoherently, death occurs suddenly from collapse.

Treatment consists in the free administration of stimulants; the prognosis is very bad.

Delirium sometimes, though not frequently occurs as the result of great and sudden haemorrhage; Hunt has ~~shewn~~ drawn attention to and described this form of delirium; there is a mild rambling with usually pleasant sensations. If the patient faints sufficiently to check the bleeding and in the meantime appliances are used to prevent its recurrence, there may be reaction, sometimes very rapid, and the patient will often speak regretfully of the glories through which he has passed. If the case is going on to a fatal termination distressing restlessness sets in and this with the delirium continues until death. I have never seen such a case in surgical practice, indeed they are seldom seen unless the surgeon happens to be present, as on the battlefield at the time of the injury. I have, however, seen a similar case in obstetric practice; the patient had a most severe flooding after an abortion; at first she was in great agony and distress; there rapidly supervened a mild rambling condition in which she was apparently quite happy; she then became apparently moribund but was revived by the hypodermic injection of Ether and by large saline enemata. This condition has been drawn attention to by Barnes who says that delirium is sometimes noticed among the other signs

of prostration in severe post-partum henorrhage; he states that this condition may be recovered from. Treatment of course consists in arrest of the haemorrhage and subsequent stimulation; the prognosis is not absolutely unfavourable.

PAIN.

Before considering to what extent Pain may act as a predisposing or exciting cause of delirium in cases undergoing surgical treatment, it will not be unimportant to consider briefly what pain is; this is a question which has been fully discussed by Meynert; his views may be stated to be somewhat as follows: -Peripheral irritations are transmitted to the higher centres in the form of stimuli; these stimuli cause changes to take place in the cells which form those higher centres and as a consequence muscular movements tend to be or are produced; at the same time there is immediate inhibition of nerve conduction, increased arterial pressure and deoxygenation as well as impaired nutrition of nerve ~~conduction~~ cells; the latter effects of the stimuli are recognised in the conscious ~~sensation~~ condition as pain. The character of the painful sensation depends largely on the radiation of the peripheral irritation; thus a slight prick with a pin is hardly felt as pain, for little inhibition is required to control the normal reflex, whereas an extensive burn requires a much greater inhibitory effort to prevent the widespread muscular reflexes consequent thereon, and this intense inhibition is recognised as pain. The inhibitory effort is accompanied by a certain amount of constriction of the cerebral arteries, and the continuance of the conscious state depends on the amount of this con-

striction and consequent cerebral anaemia. Hence swooning may result from intense peripheral irritation which demands a constant inhibition of the grey matter , for it is the grey matter, according to Meynert's assumption, which acts as an inhibitor of the irradiation of any given irritation beyond the normal reflex. This inhibition is necessarily accompanied by a reflex contraction of the arteries and this implies a deficiency of oxygen and normal nutriment to the nerve cells with the resulting disagreeable sensation of pain. Here we have all the elements for the excitation of a much more serious cerebral state, namely actual dissolution of the 'centres of association' to some degree. In support of this view of the essential natuae of pain Clouston adduces the fact that when during a period of pain a patient loses control over himself, that is, when the resistance to the irradiation consequent upon the peripheral irritation ceases and the patient stamps his feet, shouts, weeps or rushes about, there is sensible relief to the pain.

It will now be readily understood that delirium and even actual insanity may sometimes result from long continued pain; Clouston states that he has seen two cases of ladies who developed melancholia after painful surgical operations; and that he has also seen melancholia after a painful attack of rheumatism.

Delirium may also result from a sudden attack of pain; a familiar instance of this is afforded during Parturition, it being well known that during the intense paroxysm of pain that occurs as the child's head is passing through the Cervix or Vulva, the mother sometimes loses all inhibitory power and passes into a condition not distinguishable from that seen in an attack of acute mania; under these conditions the delirium is usually of very short duration, but while I was at the Rotunda Hospital at Dublin a case occurred in the extern practice which lasted for two hours; during the whole of that time the patient was apparently in a state of mania, dashing about the room, and it required the united efforts of four students to prevent her from injuring herself; the symptoms passed off immediately the child was born. According to Keen & White a similar condition may sometimes be seen in surgical practice; they state that 'in some, pain alone is sufficient to produce temporary mental aberration which disappears immediately upon the subsidence of the pain'. Pain, however, is very seldom the exciting cause of delirium in cases under surgical treatment at the present time; I find that it was so in only one of twenty-four cases of delirium due to all causes other than acute alcoholism; these twenty-four cases of delirium occurred among 2437 patients admitted to hospital for surgical treatment, and on whom 1424 operations were performed; it is at once evident

then that this form of delirium is extremely rare in general surgical practice. Whether delirium resulted more frequently from pain prior to the introduction of anaesthetics, I am unable to say definitely as I can find no records on this subject; I fancy, however, that swooning came as a relief in most instances to the acute pain of a surgical operation done without anaesthetics; and the mere fact of the absence of any definite record of cases shows that the delirium of pain can never have been of more than very occasional occurrence; it is not even mentioned as a possibility in the article on Delirium in Ashurst's Encyclopedia of Surgery. I am certain, however, that there is a Delirium of Pain, of which the following case is an instance. A.B. Male. Aet. 30 years. Single. Suffering from multiple neuromata throughout the cerebro-spinal nerves and a number of soft skin tumours; he had several months previously had the right arm amputated at the shoulder for recurrent sarcoma of the median nerve, and the sarcoma had recurred in the stump. He showed well marked cachexia, and was worn out with pain, which was almost constantly present, except when the hydopermic injection of morphia gave temporary relief. The dose of morphia had to be constantly increased; a month after admission he was getting it in 2/3rd grain doses hypodermically whenever he wanted it, and in this way got 4 grains in the 24 hours. At this time he

became delirious losing all inhibitory power; he was extremely noisy and shouted so constantly and so loudly that he had to be removed to the special ward; for several days morphia did him little or no good, but he gradually recovered his inhibitory power and in 10 days was able to be removed back to the ordinary ward; he was shortly afterwards removed home at his own request and died a few weeks later without however any recurrence of the delirium; it is interesting to note that at the time of leaving hospital he was getting 9 grains of morphia in the 24 hours.

This is the only case I have observed in which pain produced such disastrous results; that it did so in this case may have been partly due to the well marked cachexia which was present; I have elsewhere recorded a case of delirium which was regared at the time as due to chloroform; I think it probably was, but as I mentioned when discussing the case I am not quite certain that it too may not have been a delirium of pain; at any rate it was relieved by morphia, and occurred after excision of the knee, an operation which I have observed to cause more pain during the first few hours after operation than any other; in this case the patient was restless, noisy and excited for more than 2 hours.

The treatment of the delirium of pain is to relieve the pain; intense pain should always be

relieved as soon as possible, not only for humanitarian reasons, but because intense or long-continued pain is most exhausting to the patient; pain may even cause death. In cases under surgical treatment the best means of allaying pain is morphia given hypodermically in 1/6th of a grain dose, repeated if necessary; if morphia fails or is inadmissible any of the numerous sedatives and hypnotics may be tried, but I do not know of any of them being of special value; in children chloral is probably the best drug to use, and it may be conveniently given as the syrup of chloral. Locally there is probably no better ~~an~~ analgesic than a hot fomentation, on which if thought advisable a little laudanum may be sprinkled.

HEAD INJURIES.

In discussing the delirium due to head injuries, it is important to distinguish whether the delirium is primary, secondary or remote, where by ~~remote~~ primary we mean occurring within 24 hours, by secondary occurring later than 24 hours, but not later than 10 days and by remote later than 10 days after the injury; we must distinguish too between the cases in which there is gross cranial lesion and those in which there is gross cerebral lesion, and those in which there is neither; this distinction ~~it~~ is not always possible to make as head injuries if serious are usually complicated, but it will simplify matters to consider these conditions separately.

First then let us consider head injuries without gross cranial or gross cerebral lesions; neither primary nor remote delirium occurs after these, but secondary delirium is not uncommon after septic processes have had time to develop; the tendency of Erysepelas or other septic processes to develop in connection with wounds of the scalp or face, especially if the patient be alcoholic, or the wound has not been treated from the first with proper antiseptic precautions is well known; the delirium that may result in consequence, however, falls to be considered under the headings of those conditions which really cause it.

On considering gross cranial lesions we find that they are not followed by primary delirium unless there be also concussion, ~~wh~~ in which case the delirium falls to be discussed under that head; secondary and remote delirium have both been often observed; the secondary delirium is almost, if not always due to the development of septic meningitis; this is a complication that may arise in connection with compound fractures of the vault, more especially if the dura mater has been also injured; it occurs more frequently after fractures of the base, which are practically always of necessity compound. The meningitis usually develops in three to five days after the injury; the delirium is entirely due to this condition and therefore will subsequently be discussed separately. Remote delirium is often due to the injury having been complicated by a gross cerebral lesion, but may be independent of this; thus a depressed fracture if unrelieved may give rise to mental symptoms, and similar results may be caused by the new formation of bone in the process of repair of any fracture. Simpson states that in Trinity College, Dublin, there are three skulls, each showing a depressed parietal fracture with a ray to the base; all recovered in the first instance but all developed homicidal mania in consequence of which two were hung and the other was confined in Dundrum Asylum.

With regard to gross cerebral lesions the simplest condition we have to consider is concussion; in

this case there is at first complete unconsciousness; the coma may remain and lead on to death; if it pass off, which it often does after being of only very short duration, there may be delirium as the dissolution becomes less; in the large majority of cases the delirium is very temporary and the patient then completely recovers.; it may, however, last longer, even for several days; it may then gradually disappear leaving perhaps the memory weak or other functional impairment, such as aphasia, depending on the site of the injury; this may also gradually pass off, but if there is any more serious cerebral lesion, it may continue and, secondary degeneration starting from the original lesion, remote mental and cerebral symptoms may develop; it is often noticed in cases of head injury even when there has been nothing more than concussion that subsequently although there is nothing definitely wrong, the patient is never quite himself again; the intolerance of alcohol in such cases has been frequently commented on; a small dose in some instances subsequently causes furious delirium.

We must now consider those cases in which there is an actual localised cerebral lesion; on studying the works of Hughlings- Jackson, Ferrier and other authorities on the brain and nervous system we are at once struck by the meagre mention of delirium as a symptom when there is a gross cerebral lesion; the reason for this has been already explained to

be that 'delirium manifests itself through the impressions made upon the cortical grey substance of the brain ; the cells and fibres of this substance must therefore be in a receptive condition; and need not of themselves deviate from the normal state; in fact a perfectly healthy cortical matter, if the received physiological views of its purposes are correct, is more consistent with the occurrence of the severest forms of delirium than one which is otherwise' (Forbes); extensive lesion of the cortical grey matter must necessarily destroy its function altogether. Primary delirium apparently occurs only after injury of the occipetal lobes; possibly it also occurs after lesions of the pons after which according to Forbes there is a tendency to cry more than to laugh, but no true delirium; there is no record of its occurring after any other localised cerebral lesion though as Forbes points out a careless observer might think it did; thus after injury of the crura the resulting paralysis of the third nerve and consequent diplopia and double vision with some confusion of speech might mislead; so also after injury of the corpus striatum there is slight thickness of speech and emotional phenomena, but no true delirium; the aphasia due to injury of the posterior and inferior parts of the frontal lobes is of course in no sense a delirium nor is the failure to recognise objects by sight after lesion of the angular gyrus.

Secondary and remote delirium may occur after injury of parts of the brain other than the occipetal lobes but that is due to involvement of the Meninges. With regard to the delirium seen after injury of the occipetal lobes the most definite account has been written by Miles; he has recorded two cases of "trade-like movements, following head injuries" in both of which on post-mortem examination the interior of the right occipetal lobe was the seat of a small vascular lesion'. Miles' cases are very interesting; the first was that of a plumber who fell sixty feet from a roof while at his work; when "put to bed, an hour and a quarter after the accident, he became restless and even violent. In his delirium he seemed to imagine himself at his work and he continued to address his fellow-workmen, and to make movements which one of them voluntarily described as those of beating out lead. The right hand went through short, sharp hammering movements while the left was constantly moving about as if smoothing down the lead. He occasionally made evident attempts to grasp some imaginery object in the air; this condition lasted for about eight and a half hours". He them improved somewhat but ultimately sank, and died seventy five hours after the injury. The second case was that of a sculptor who fell nearly forty feet while engaged in carving the front of a building; half an hour after he was very excited and would not recognise those about him; he was so violent that he had to

be given one eightieth of a grain of hyoscine which quieted him for a time; he was afterwards "much quieter, although ~~continually~~ constantly muttering and moving his arms. It was observed that the movements of the arms were distinctly rhythmical and co-ordinated, and they were recognised to be those of a sculptor at work. The left hand was kept firmly clenched and fairly stationary, while the right, also closed, made short, rapid movements as if hammering. This condition was observable for some hours". He afterwards regained a considerable amount of consciousness but died ten days after the accident. As far as I am aware these are the only two cases on record in which after such symptoms, the actual lesion was ascertained by post-mortem examination; although there were other small haemorrhages, I think we may agree with Miles that the delirium was due to the lesion in the occipetal lobes. Four similar cases after head injury have been noted, but in them there was no post-mortem examination as the patients recovered. One was described by Miles it was that of a painter who "while standing on a ladder painting a sign-board fell to the ground and sustained severe head injuries; when still in a semi-sensible condition he continued for long periods to paint imaginary signs on a screen beside his bed, steadying the right hand with which he made fine up and down movements on the opposite fore-arm". Two as stated by Miles were observed by Callender in 1867; one of these fell thirty feet

through a trap door and "suffered from concussion, with restlessness. He had eventually, whilst yet insensible, to be strapped down to his bed to prevent him from leaving it, as he had repeatedly done for the sole purpose of pacing to and fro across the ward as though he were pursuing some ordinary occupation. He was night-watchman in a warehouse." Again a sailor from one of the river steam boats "was supposed to be suffering from convulsive movements affecting the upper extremities and associated with concussion; but one of his friends as soon as he saw him explained that he was only busy steering his boat." According to Simpson, Kaempfen has recorded that a riding master who was thrown from his horse continued automatically to give a riding lesson for three quarters of an hour. These cases must be treated by complete physiological rest; restraint being employed if necessary; alcohol and other stimulants must be withheld.

With regard to remote delirium in cases of head-injury it is to be observed that after any injury not only of the head, though it is then more likely to occur, there may be more or less suspension of the functions of the brain and cord. They may later give rise to psycho-neuroses or chronic organic disease, or may precipitate a latent insanity; traumatic insanity in youth is characterised by quasi-maniacal attacks, and a mischievous and irritable disposition, is, in fact, a moral insanity; in the

adult it generally takes the form of psycho-neuroses or of delusional insanity, or of mental symptoms dependent on the organic brain disease that has been lighted up. The psycho-neuroses take the form of immoral acts, hallucinations, and attacks of explosive violence; these often develop later into Insanity. Delusions are usually of a hypochrondriacal nature or of conjugal infidelity. Sometimes general paralysis of the insane follows trauma; Mickle says this especially occurs if the right hemisphere is more injured, while if the left is more injured, melancholia develops.

The prognosis in these cases varies with the time the functional disturbances appear, the sooner the better; it is very bad if it comes on late.

We have already seen that delirium is but seldom observed as a symptom of head injury; it is not more frequently observed in those suffering from disease of the same region; indeed on studying the writings of most of those who have devoted special attention to diseases of the central nervous system we cannot fail to be struck by the fact the delirium is scarecely ever mentioned as a symptom of those diseases; with regard to the brain itself, Gowers states definitely that delirium is seldom due to organic disease of that organ, and he is confirmed by others. The reason for this has been already explained in the section on Head Injuries where it was pointed out that a perfectly healthy cortex is more consistent with the occurrence of the severest forms of delirium than one which is otherwise; the functions of the cortex are disturbed by its environment in the form of meningeal inflammation or by slight irritative exudations or haemorrhages pressing upon it, but great pressure would suppress its workings altogether. Occasionally delirium is observed in cases of cerebral tumor but it is nearly always due to the subsequent onset of meningeal inflammation; Gianelli has made an exhaustive study of the effects of brain tumors on mental function; he finds tumors of the corpus striatum are always accompanied by mental disturbance; he also finds psychical disturbances

occur frequently when the tumor is in the frontal lobe; thus in tumors of the frontal lobes he observed psychical disturbance in 77 per cent, while in tumors affecting parts other than the frontal lobes there was only psychical disturbance in 54 per cent.; he also finds that the mental symptoms appear earlier if the frontal lobe is the seat of the tumor; hallucinations he considers indicate irritation of the corresponding cortical sensorial centre; ideas of grandeur are often observed in tumors of the frontal lobes. In meningitis delirium is a common symptom; the patient is often peculiarily irritable and there is intolerance of light and sound; when due to a septic origin it usually develops in from three to five days after the injury. In all these cases the delirium must be treated on the ordinary lines, special care being taken to avoid all source of irritation from noise or strong light; stimulants, especially alcohol, must be withheld unless certainly indicated by the state of the pulse. If the delirium is due to a tumor and the site of that tumor can be diagnosed, then in certain cases there is a ~~certain~~ prospect of cure by operation, but the number of such cases must be very limited; generally by the time delirium occurs the growth will have extended so far, or have set up so much secondary inflammation as to make the Prognosis all but hopeless. In cases of meningitis the prognosis is most unfavourable; in septic Meningitis it is absolutely so; possibly some cases

of tubercular miningitis recover but we have no proof that they do.

The mind is manifestly influenced by the other functions of the organism, and the organ through which those functions are performed" (Clouston). This is perhaps more true of the function of alimentation than any other; Maudsley in speaking of the inter-dependence and inter-action of body and mind, says with reference to the abdominal organs "no one will call in question that states of their functions do exert a positive influence on our states of mind. In health we are not conscious of the impressions which these organs make on the brain, albeit they assuredly send their unperceived contributions to the stream of energy of which consciousness is the sum and the outcome, but when a disordered organ sends a morbid impression to the brain it no longer does its work in silence and self-suppression, but asserts itself in an unwonted affection of consciousness"; the influence of constipation for instance in preventing healthy mentalization is well known; so also functional disturbance of the liver, even if slight, frequently impairs temporarily the workings of the mind; the extent to which such disorders upset the mental balance depends largely on the inhibitory power possessed by the patient, or in other words on how deeply he is branded with the stamp of the neurotic diathesis; hence is developed the hypochrondriac who has some trifling disorder which he cannot in-

hibit from his consciousness but which is ever present in his thoughts and words. The change to actual Insanity in connection with some lesion of the organs is but a step; prolong or aggravate the disease, lower the inhibitory force , and the mental equilibrium may be entirely upset. Many such cases of Insanity are recorded by writers on Psychology - cases where the patient has been dominated by a delusion that rats were eating away his vitals, that the devil was inside his belly and that he had no stomach and when after death he has been found to have suffered from some organic disorder such as stricture of a part of the alimentary canal. The mental disturbance usually, if not always t—ends to the melancholic type and may occur in connection with disease of any abdominal organ; I have already referred to the disturbance in connection with hepatic disorder; this is always of a profoundly melancholic type. Ruggi has described a curious case occurring in connection with pancreatic ..... disease; the patient, a woman of fifty had a swelling of the abdomen with occasional severe pain; she showed considerable mental disturbance which gradually developed into well marked melancholia; laporotomy was performed and a large emcephaloid cancer involving the pancreas was removed; as she recovered from the operation the mental depression gradually disappeared, and in six weeks she was quite well both mentally and bodily.

Under the heading of Intestinal Toxaemia I have fully

described some curious results of the effects of constipation and so need not now do more than refer to the changed mental condition often seen in constipation.

Diseases of the rectum are extremely liable to cause depression and even actual Insanity of the nature of Melancholia; such a condition often occurs in Carcinoma of the Rectum and I have commented on such cases in treating of Malignant disease; Piles, Fissure, and Fistula, however, have the same effect, especially the former; all surgeons are familiar with the hang-dog expression and miserable appearance frequently exhibited by those suffering from Haemorrhoids and which is probably due to the portal congestion and consequent hepatic derangement.

Maudsley suggests the interesting question whether each of the internal organs has not a special effect in giving rise to particulars feelings with their sympathetic ideas; I do not think, however, we can distinguish from the nature of the delirium which abdominal organ is affected; the anatomical and functional arrangement of the organs are such that we should expect to find very similar mental symptoms set up by disturbance of any one of them; such symptoms are melancholy with possibly perversions of the sense of taste and smell, and often an idea, which is certainly so far correct, that the food is doing no good; although there is often depression, suicidal tendencies are very rare.

I think I ought to make some reference to the

unsatisfactory results that sometimes follow abdominal operations which are in themselves absolutely successful; the bad result being due almost entirely as I believe to the weak mental equilibrium of the patient. The following case is an example.

W.M. aet. 55. Single . Mason. For 18 months had suffered from constipation, flatulence and abdominal pain; at times has been almost quite well, at others suffering very much from pain and flatulence As the pain became very bad and there was considerable abdominal distension his doctor sent him to the hospital. Nothing special in the family history. Personal history and previous health good; he is a Highlander and has always lived in a Perthshire village. On admission he looked ill but was not much wasted; was very depressed and anxious about himself; the bowels had not moved properly for three weeks; abdomen swollen and tympanitic all over; sometimes a little pain low down on the left side. Heart, lungs and kidneys healthy. On examination was found to have rectal carcinoma; as it was judged impossible to remove the disease Inguinal Colotomy was performed, the gut being opened at once and a glass tube fixed in; much faeces and wind were got away. Some Iodoform was applied with the dressings. Shortly after the operation a half-grain opium pill was given to relieve pain and this had to be repeated at night; a quantity of faeces were allowed to escape in the evening;

ing; at 10 p.m. he was very despondent and anxious though he was doing well; he was ordered one drachm of whisky with one drachm of water every hour.

The subsequent progress is indicated by the following extracts from the daily reports.

1st day after operation: Had a fairly good night; some faeces allowed to escape by wound; ordered milk and soda water when he wished it and half an ounce of whisky every four hours. At night required one-sixth grain morphia hypodermically.

2nd day: Wound healthy; faeces coming away freely when allowed to do so; a little restless at times; very anxious about himself; had a half grain opium pill.

3rd day. Doing well.

4th day. Faeces escaping freely; very despondent and anxious about himself; seems to think he cannot get better; not taking much food.

5th day. Wound doing well; a little brighter.

6th day: - At night restless and excited, throwing the clothes off the bed; seemed to forget where he was at times. Had one-sixth grain morphia hypodermically at 9.p.m. after which slept for half an hour; morphia repeated at midnight and he then slept moderately well.

All Iodoform was now stopped in case the condition might be due to it; no great quantity had, however, been used.

7th day: Better; quite rational; had a dose of Castor Oil after which the bowels moved freely.

At midnight he was again restless and irrational; after one-third grain of morphia hypodermically he became quiet and slept at intervals.

8th day. Rational in the morning; towards evening he became excited and peculiar in manner and so was given one-third grain morphia; he was also ordered half-an-ounce of Henry's Solution of Sulphate of Magnesia and subsequently two drachm doses every 4 hours of the same mixture.

9th day: Not quite so restless last night; is very depressed during the day; seems to have no wish to get better.

10th day. Much the same.

11th day. Very restless and excitable last night.

12th day. Quieter last night; better this morning; ordered 40 grains Sulphonal at 6.p.m.

13th day. Restless last night; got out of bed once; resisting all interference and attempting to strike the nurses when they attend to him; he is, however, becoming very feeble. Ordered two drachms of Bromidia at night.

After this he gradually became ~~more irritable and~~ weaker and more irritable; he suffered much from Insomnia and was always depressed; he gradually sank and died a week later though the operation had been in itself a success.

Possibly in this case other causes than the mere process of rectal lesion contributed to the functional mental derangement; although the patient was only 55 there was I think something of the senile

element in his case.

All surgeons are familiar with such cases, the condition is especially seen in Highlanders of the Crofter class and is even more marked in the inhabitants of the Orkneys, Shetland and other outlying islands; the hypochrondriacal tendency among these people has been often noticed and has been termed "morbues Orcadiensis"; various theories have been suggested to explain it; the most probable is that it is due to animal food being an insufficient item in their dietary. The surgeon is often placed in great quandary in such cases as to whether he should operate or not; if there is a local disease not serious in itself it is often hard to tell whether it is the cause or the accompaniment of the mental condition; I believe that it may be either and hence the varying results of treatment, some cases being quite cured by an operation while others remain in statu quo.,,or even get worse. It is always useful in such cases to get exact information as to the mental state before the bodily disease declared itself; this unfortunately cannot always be done and then the surgeon must simply trust to the estimate he himself is able to form of the original amount of neurotic taint.

As regards the treatment of such cases other than operation, everything must be done that can be done to re-establish the normal function of the organ affected; as far as compatible with this

this the patient must feed up and be stimulated; alcohol and strychine are especially valuable. The prognosis is bad when a patient becomes markedly despondent after an operation without an obvious physical cause; they do not take nourishment well and gradually sink and die.

If there be any one who doubts that the working of the mind is influenced by the conditions of organs other than the brain, he cannot fail to be convinced by observing closely the mental effects produced by lesions of the reproductive organs; to the psychologist the functions of these organs are all important; to the surgeon the unhealthy states of mind produced by injuries or diseases affecting them are well known. Are there not on record cases of men who have suffered great mental distress because they have discovered that one testicle is hanging a little lower than the other? This mental distress is more marked of course in cases where there is some definite lesion, unimportant however in itself, such as a simple Varicocele, a condition which frequently causes great alarm; the patient believes he is impotent and sometimes, if he have a strong neurotic taint, nothing will persuade him that he is not so except a radical cure, which sometimes has to be done chiefly if not entirely for this reason. It is extremely probable that many cases of so-called hysteria in women are due to a varicose condition of the ovarian veins, a condition which unfortunately cannot be diagnosed. The connection between Insanity and Uterine disease has been fully investigated by More- Madden; on examining 2445 patients who came to the Mater Misericordiæ Hospital, Dublin, suffering from Uterine disease, he found that 30 per cent

exhibited nervous disease varying from trivial hysteria to the gravest mental disturbance. The ultimate and evil affects of Ovariotomy too are well known; thus Richards has reported a case of a lady 33 years of age from whom the ovaries were removed for local disease; before the operation she was a bright intelligent woman; six weeks after it a distinct change in her character was noticed; she began to suffer from delusions, and ultimately developed Melancholia from which she never recovered. Thomas Savage states that he has seen Insanity four times after 500 operations for the removal of both ovaries; three of them recovered and one committed suicide; Insanity has also been reported as occurring after the removal of one ovary. Althaus says that there are two forms of Insanity after Ovariotomy.-

(1) Violent delirium, lasting only a few days.

(2) Pronounced Melancholia.

He also states that there may be various hysterical conditions . Clearly Ovariotomy should not be performed unless there are urgent indications for its performance; we must hope that Cullingworth is correct when he says that he does not believe Insanity occurs after removing diseased ovaries. It is believed that the mental disturbance after Ovariotomy is largely due to the loss of the secretion of the ovaries, and also to the trauma to the rich sympathetic plexus; these same causes operate in Castration when in addition the obvious loss of the organ

may increase the patient's mental distress. The following is a case of delirium after Castration; it was complicated by suppuration in the wounds and the senile condition, but I believe the loss of the testicles was the chief cause of the mental disturbance, which took the form of excited melancholia.

G.M. aet. 69 . Widower. For some years has suffered from frequent painful micturition due to enlarged prostate. Family and personal history good. The testicles became very tender and the urethra so markedly so that catheterisation was impossible; accordingly castration was performed as a palliative measure; the urine was of course purulent and at the time of operation contained a trace of albumen, and was full of bacteria. Unfortunately the wound became septic and as a result he suffered from secondary haemorrhage on both sides a fortnight after the operation; the stringent means undertaken to control the haemorrhage fortunately also checked the suppuration and the wounds in future remained healthy. Iodoform was being occasionally used in small amount and its use was continued for another week when it was entirely stopped. At that time a note was made to the effect that since the operation he had gradually become peculiar; his memory was bad, and he became fretful and complaining; on two occasions he tried to get up, but did not remember this afterwards. He was sleepless and did not take his food well. At mid-night on that day he was excited - said the nurse had false-

ly accused him of getting up; he said he was drunk and said he had been made so by the nurse who had just given him the ounce of whiskey he was having every four hours; half an hour later he was less excited but very anxious to prove his sanity; he said he knew we thought he was going off his head but he could assure us he was all right. Later on in the night he got out of bed several times. Two days later he was very feeble; he feared he was going queer; he was talkative , rambling and his memory was much impaired. The next day he was better and also the next; then he got worse again and in the afternoon threw a glass at the nurse; at night he was talkative, incoherent and excited; he gave me a long rambling account of a plot he suspected to murder one of the nurses who he said was in the hospital under an assumed name; then he became quiet and rational again. The next day he was much the same but was with great difficulty induced to take food and medicine; the following day he was much worse; he became very excited, shouting loudly at times and would not keep the bed clothes on; in the afternoon he had to be removed to the special ward where he remained in much the same state for two days and then sank rapidly and died, his mind never becoming clear before the end; he died 33 days after the operation.

GANGRENE.

If we enquire thoroughly into any case of gangrene, in which delirium occurs, we shall usually, if not always, find that the mental disturbance might fairly well be ascribed to some cause other than the local condition; thus it might be said that the delirium is often the result of septic absorption, owing to the gangrene either having been infective from the first or having subsequently become so; on the other hand in those cases of dry gangrene in which delirium occurs before infection has taken place it might not unreasonably be said that the nervous excitement is due to either cerebral anaemia, pain, which is often a marked symptom in dry gangrene, chronic alcoholism or the inanition preceding death, or a combination of these causes - When however, we consider gangrene per se we find that during its progress delirium is a symptom of such frequent occurrence while the question of its amenability to treatment forms such an important element in the prognosis, that it seems advisable to consider the significance of delirium in these cases independently of its actual cause.

Delirium may occur in any form of Gangrene, whether the gangrene be due to a Traumatic, Local, Constitutional or Infective Cause, but it occurs more frequently in the two latter varieties; in twelve cases of Gangrene of various kinds, I find that

delirium was a marked symptom in no less than eight; the type of delirium is generally described as "low and muttering" by which we understand that the patient is more or less unconscious of his condition and surroundings, and lies in bed muttering quietly to himself, making perhaps every now and then a feeble effort to get up which often results in little more than throwing the bed clothes partly off. Such a patient is usually easily managed especially as he is often so feeble that he cannot make any serious effort. The delirium may take a more noisy form as in the case of a patient operated on for Strangulated Hernia in whom after death a portion of the intestine was found to be gangrenous; this man repeatedly threw off all the bedclothes and shouted loudly for a cab to come and take him home; he was so noisy that it was necessary to remove him to a special ward. It is interesting to note that in this case delirium was the first unfavourable symptom to develop after operation and was indeed the only marked sign that anything had gone wrong; the following is a brief record of the case.

A.P.aet.45, previous health good, of temperate habits. On the day before admission to hospital, while straining at stool an inguinal hernia came down and could not be returned; on the following day his doctor sent him into hospital for operation; as there were signs of strangulation an operation

was at once performed; it was found that a portion of the intestine involved was almost if not quite gangrenous, and this portion was accordingly resected and a Murphy's button introduced. The temperature which had been 100° on admission fell to normal the next day and did not rise again till a few hours before the end; although the patient did not rally as well as it was hoped he would after operation, there was no obviously unfavourable sign till the third day when he developed the noisy form of delirium previously described; there was a little tenderness in the region of the wound which, however, looked healthy; the delirium continued and two days later there was slight suppuration in one of the stitch holes; the next day the patient was much worse, sank rapidly and died. At the post mortem examination it was found that the intestine was gangrenous on both sides of the Murphy's button and that ~~were~~ there was general septic peritonitis. The question naturally suggests itself, was the occurrence of such marked delirium in itself a sufficient sign to indicate that so serious an accident had supervened on the operation, and to justify opening the abdomen again? Certainly the patient's general condition was not altogether satisfactory, after operation, but the delirium was the only unfavourable sign. It was evident that the delirium was not due to any drug toxaemia as before operation the skin was disinfected with soap and water,

ether and a 1 to 40 carbolic poultice applied for only a quarter of an hour while at the operation Boracic lotion was the only antiseptic used; the delirium, as far as could be ascertained, was not due to Chronic Alcoholism; on the other hand the delirium owing to the bowels not having been moved for three days before the operation was probably in part at any rate due to a condition of entero-sepsis and as such might be hoped to disappear when the intestinal functions were again established. I have elsewhere recorded a not unsimilar case in which the wound healed by the first intention and the delirium passing off, the patient made a good recovery; and it may therefore be said that the mere occurrence of delirium was certainly not diog-nostic of the condition found post-mortem; had a second operation been performed I doubt very much whether it could have averted a fatal issue as on carefully analysing the cases of gangrene of which I have records I find that no patient who developed such marked delirium ever recovered; this, however is a question into which I shall go more fully when in considering the Prognosis.

Treatment. In considering the treatment of this form of delirium, it is important to notice first the general treatment of gangrene; there is of course no cure except a radical operation and this is always done except when it is evident that such a radical operation proceeding would only hasten a

fatal issue; in the spreading form of gangrene there is no time to delay but in the dry Variety it is often advisable to temporise, but it is unnecessary to discuss here the proper time for operation. The general treatment may be briefly described as light diet, opium; do not stimulate unless really necessary; be guided by the tongue and pulse; if they improve the treatment will do. In the infective forms stimulants will frequently be necessary, and the serum treatment may also be tried. In the special treatment of delirium when it occurs opium is our sheet anchor; it is probably best to administer it in the form of a pill though it may also be given in the form of suppositories or by the hypodermic injection of morphia; it should be remembered, however, that in the constitutional forms of gangrene at least there is a special risk with hypodermic medication of localised abscesses or even more serious results supervening; it will often be found that large doses of opium are necessary, as much as one grain four times in the twenty-four hours being often found advisable. Opium is unfortunately not the absolute specific its original advocate Pott hoped it would be, but extended experience fully justifies us in accepting Brodie's dictum that the success of a case depends on whether or not opium agrees. Should opium not control the delirium I do not know of any treatment that will; indeed with our present resources we must acknowledge that failure with opium is a sign that a

fatal issue is not likely to be long delayed, many of these cases of delirium being really the delirium that sometimes precedes death; it is important to bear this in mind and not to expose to the possible opprobium of being treated in a special ward a patient who shortly after his removal will sink into a comatose state in which he can cause no annoyance to others; in such cases also it is well if the delirium occurs at night to try the effect of light in calming the patient before adopting more drastic means; this simple treatment was sufficient in one case of delirium complicating gangrene; the patient, a feeble old man was under treatment for suppurative phlebitis of the leg and subsequently developed senile gangrene; the next morning after this unfortunate complication occurred I was called to the patient at 6.a.m. as he had become restless, noisy, and excited and had pulled his dressings off; the ward had ~~been~~ previously been dark; the gas by his bed had to be turned up while attending to him and I directed that it should be kept so; in half an hour he was quite quiet; a few hours later he was too feeble to cause any disturbance and died the following day.

Prognosis: - I have already indicated that the question of controlling delirium by opium in gangrene is all-important; should it fail the case is hopeless; of the twelve cases of gangrene of which I have definite records eight died and four recovered; those patients who recovered either

were never delirious or were not more affected mentally than to be restless and a little excited and the unfavourable symptoms rapidly passed off on the administration of opium; they were never so bad as to require treatment in a special ward. In the fatal cases on the other hand delirium was always present, did not yield to treatment by opium and ~~in these cases~~ was of such a nature as to necessitate ~~their~~ removal to a special ward. On examining these cases a little more carefully, the conclusion I have stated is most strikingly brought out as in several of the fatal cases the conditions, if we disregard the mental disturbance, were such as to justify hopes of a better result, while in two at least of the successful cases the conditions, excepting that there was no mental disturbance, were such that the operation was done with the gravest misgivings and its result was an almost unexpected surprise. Thus one of the successful cases was a man eighty-five years old suffering from senile gangrene of the foot; no delirium; after amputation at the knee one of the flaps sloughed; in spite of this, however, the wound ultimately healed well and the patient made a good recovery; compare this with a man of only 59 also suffering from senile gangrene of the foot, delirious at night; in this case also amputation at the knee was performed and a flap sloughed, and the patient sank and died 3 days later. Another successful

case occurred in a patient of 40 who suffered from moist gangrene which at the time of operation had spread as far up as the ankle while there was malignant oedema as far as the knee; he was quiet and mentally unaffected but very ill and little, if any, hope was entertained of his recovery; after amputation, however, through the lower third of the thigh he improved rapidly and made an uninterrupted recovery; this compares curiously with the case of a man also with moist spreading gangrene, but in whom it spread much more slowly, the tissues above the ankle being healthy; he was described as "quite off his head"; he was very noisy, restless and excited and had to be removed to a special ward and did not respond to treatment by opium; after having his leg amputated at the knee he became quite sensible and appeared at first to do well, but on the third day he began to go down-hill and died the next day, the wound being perfectly healthy. Another successful and interesting case was the following: - R.S. aet.44; has had senile gangrene of the foot for ten weeks; has a mitral systolic murmur and athromatous arteries; 27 years ago he developed hermphlegia of the whole of the right side, the paralysis of the arm still remains; a prematurely old man and apparently not a good subject for operation; before operation he was occasionally a little restless at night but one-sixth of a grain of morphia was always sufficient to rectify this - never any marked delirium. The leg was amputated

at the knee and the wound healed by the first intention, the patient getting up on the 18th day. The cases under review are unfortunately few in number, but the results they show are I would submit quite what we might expect to find; and I think that in cases of senile gangrene at any rate the absence or presence of delirium gives a very definite indication as to whether or not an operation should be performed.

With regard to the infective cases we do not yet know whether the administration of antistreptococcus serum after delirium has occurred will, in conjunction with an operation, avert a fatal issue; it will be interesting to see what is the teaching of extended experience on this point; with the resources previously at our command we must admit that in any case of gangrene we are powerless to affect the issue once marked delirium has occurred.

DELIRIUM PRECEDING DEATH.

During the last hours of life a patient frequently becomes delirious; this delirium has a character of its own and it is important to recognise it; it would be lamentable to send such a patient to an asylum. As regards the frequency with which delirium occurs before death, Symonds says that there is "usually some delirium", while Munk in his treatise on Euthanasia, though making no definite statement, seems to imply that it occurs in the majority of cases; I certainly think this is so, but that unless specially looked for it often escapes observation, as the delirium is of a quiet nature and frequently of short duration, the patient passing rapidly into a comatose condition. It is possible for consciousness and intellect to remain perfect to the last; this happens chiefly in chronic diseases of the chest and abdomen, but it is rare; the brain must of course be unimpaired. Numerous instances have been observed of men on their deathbed expressing great truths or giving directions for the guidance of those they are leaving behind in a manner which showed that the mental faculties were far from being deteriorated; usually, however, there is an exaltation of one part of the mental constitution at the expense of others; such excitement of the imagination has doubtless frequently been mistaken for general mental vigour.

As regards the character of the delirium it may at once be said that active and violent delirium is very rare; such delirium may pave the way, but sooner or later it gives place to a low, rambling muttering delirium; between the two stages there is often a wonderful lightening of the mind, which becomes perfectly clear; the amendment, however, is only apparent for it is not preceded by sleep and accompanied by a slower pulse; it rapidly gives place to the true delirium of death; in this state the ideas are less from present perceptions than in insanity, and yet are more suggested by external circumstances than in fever; often all that is noticed is quiet talkativeness, becoming later a low incoherent muttering. Most prattle of their childhood and early life, but if the delirium is more active they refer to what has been the principal business of their life. Thus Symonds relates that Dr. Armstrong's last words were addressed to an imaginary patient, upon whom he was impressing the necessity of attending to the digestive organs. To Lord Campbell we are indebted for a dramatic account of a similar delirium. "Lord Tenterden, as he approached his end became delirious and talked very incoherently; afterwards he seemed to recover his composure and raising his head from his pillow, he was heard to say in a slow and solemn tone, as when he used to conclude his summing up in cases of great importance: - "And now, Gentlemen of the Jury, you

will consider of your verdict." These were his last words; when he had uttered them, his head sank down and in a few minutes he expired without a groan." Frequently the delirium is from the first of the nature of dementia; all the faculties are very feeble; there is no power of concentration and the memory is all but gone. Symonds states that "Playing with flowers" is often noticed; he relates a case he saw of a cultivated and refined lady who was in the last stage of a Urinary disorder , during which her mind remained quite clear till one day when he found her arranging with great care and with demonstrations of delight at her success a garland of flowers around a chamber utensil; he assumed that the end was not far off, and she justified his prognosis by sinking and dying on the following day.

Abnormal visual impressions are common; they may be excited by a tangible object as when the presence of a bystander suggests the image of a friend long departed; often they are merely reproductions of visual sensations; thus the patient may be seen feebly catching at something in the air; by the adjustment of the finger and thumb we recognise that it is very small,probably like muscae volitantes. It should be remembered that as the sight fails the apparent darkness is often distressing to the patient; the dying sometimes cry for light, and are often greatly soothed by increased illumination.

thus in speaking of Gangrene, I have related a case of a delirium in which all the distressing symptoms were at once controlled by the gas light, which had previously been lowered, being turned full on. Occasionally the dying see a blaze of light but this is rare. Analagous to this is the tolling of bells sometimes heard by the dying, and which is due to a renewal of the sensations of hearing. In the same way there are renewals of the tactile sensations, and in consequence there is "picking at the bed-clothes", the clothes being grasped in mistake for an imaginary substance; this phenomenon is noticed in all forms of delirium but occurs most frequently in the delirium preceding death.

To assist in the diagnosis we have the special characteristics of the delirium which have been already commented on; we depend chiefly however on the physical condition of which I can give no better description than that to be found in Munk's Pamphlet on Euthanasia. "As signs of death note a sharp and pinched nose, eyes sunk in the orbits and hollow, ears pale, cold, shrunk with their lobes inverted, and face pallid, livid or black; these together make up the celebrated facies Hippocratica, and show the work of dying has commenced and already made some progress."

The treatment can be only palliative; the bed-clothes must be light and constantly re-arranged to prevent any unnecessary irritation; small doses

of stimulants at not too frequent intervals if the patient can swallow; morphia in moderate doses either by mouth or better hypodermically if there is any pain; but above all light - light for the dying.

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